THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
January 28, 1991 · Vol. XXV · No. 4 · 104 Pages · $2/Copy · $48/Year

COMPUTERWORLD

SPA to crank up efforts in copy crusade

BY MICHAEL FITZGERALD
CW STAFF

WASHINGTON, D.C. — The Software Publishers Association is expected to announce today the results of the first action in what it calls "a stepped-up campaign against unauthorized corporate copying" of software, which it claims costs software publishers $3 billion per year in lost sales.

An official at the SPA said the association is also planning to conduct another round of search-and-seizure raids, hitting sites in Minneapolis; Seattle; Portland, Ore.; and Norfolk, Va., during the next two weeks.

The SPA will release details of a $75,000 settlement against the Kemper Lesnik Organization, a sports management and marketing group based in Northbrook, Ill., that manages golf's Kemper Open. Besides paying the settlement, which will go into a fund used by the SPA to fight illegal copying, Kemper will

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COMPUTERWORLD BUYERS' SCORECARD

The cost of connection

Which LAN SNA gateway offers the best cost per workstation?

Vendor	Score
DCA Irmalan	56
Novell Netware	55
Attachmate Extra!	46
IBM PC 3270 and OS/2 Extended Edition	41

Responses based on 187 users surveyed in *Computerworld*'s Buyers' Scorecard (page 62). Each respondent group rated only their own products

CW Chart: Paul Mock

Changing times take toll at DEC

Part 1 of a three-part series researched and reported by Computerworld's Maryfran Johnson, Alan J. Ryan and Sally Cusack

Three years ago, Ralph Dunlap took over a key sales operation at Georgia Pacific Co. and ran smack up against "mainframe thinking" from Digital Equipment Corp.

"DEC's solution for us was a Vaxcluster and a computer room, but our whole direction was decentralized computing," said Dunlap, an information resources project manager at the Atlanta-based conglomerate. "I kept asking, 'Why can't I do this with workstations?' The real answer was, 'We don't make any money that way.' "

Dunlap's tale and the fact that Georgia Pacific saved $100,000 by settling on 108 Vaxstations running VMS cut to the heart of DEC's struggle to conform to new computer industry realities.

With hardware profit margins sinking, DEC's mainstay VAX minicomputers cannot sustain

digital
In Transition

their past levels of profitability. The company is also weighted down with too many employees, a fact DEC painfully confirmed earlier this month when it announced plans to lay off up to 3,500 employees by midyear.

DEC President Kenneth H. Olsen, who enjoyed several years of double-digit revenue growth fueled by the proprietary line of minicomputers, now acknowledges that the money makers of the future are no longer in hardware. Services, software and "open systems" are the new darlings at the Maynard, Mass.-based firm.

DEC's service revenue grew by 16% last quarter to $1.36 billion, and its software business already accounts for 20% of revenue, company officials said. Unix-based hardware and software brought in $1.3 billion in 1990, they said, and grew by more than 300% between the first two quarters of 1991.

Chris Christiansen, an analyst at Westport, Conn.-based Meta Group, Inc., said it is "absolutely critical" that DEC make this

Continued on page 89

IBM sues lessor over parts sales

Challenge to Comdisco may limit user options

BY ROSEMARY HAMILTON
CW STAFF

IBM Credit Corp. filed a suit against the largest independent lessor of IBM mainframes last week, charging Comdisco, Inc. with illegally selling and re-leasing IBM parts. Observers expressed concern that the move could stifle leasing competition and reduce users' options when they move to upgrade or to buy new equipment.

In a filing with the Court of Chancery in Delaware, IBM's leasing and financing subsidiary charged that Comdisco hatched "elaborate schemes" of stripping, disassembling, selling and re-leasing computer equipment. ICC characterized Comdisco's actions as "taking property that belongs to someone else."

Comdisco denied the charges and said IBM has grossly mischaracterized Comdisco's business practices.

"If IBM Credit Corp. wins, then it could make it difficult for customers who want to get competitive bids for upgrades," said Frank Gens, who is a vice president at Technology Investment

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HIGH-TECH BATTLEFIELD

Computers map out Gulf war plans

BY MITCH BETTS
CW STAFF

Early every morning, Lt. Gen. Charles A. Horner, U.S. air commander in Saudi Arabia, issues a computer printout the size of a small telephone book. The military calls it the daily Air Tasking Order, but *The Los Angeles Times* calls it "a hit list, a catalogue, a shopper's guide to Iraqi assets marked for destruction in the following 24 hours."

The intricate report is assembled by computer from a mass of incoming data, including digital photographs of enemy targets taken by spy satellites, damage assessments, the speed and armaments of the allies' aircraft and even a count of how many Patriot missiles are left in the stockpile. It is a key Pentagon weapon in what is coming to be known as a high-technology war.

Americans have been mesmerized by video footage showing the pinpoint accuracy of computer-guided weapons in the Gulf war. However, the role of computers in orchestrating up to 2,000 sorties per day involving 24 types of U.S. aircraft with different capabilities and missions — as well as the air forces of the allied nations — has been just as important.

"Computers give you more flexibility to mix

Continued on page 90

ISDN to reach the masses

BY ELISABETH HORWITT
CW STAFF

In a move that could finally make Integrated Services Digital Network technology worth installing for a significant number of users, the majority of regional Bell operating companies are preparing to extend their ISDN services beyond Centrex enclaves and out to the world at large by year's end.

Existing Centrex ISDN services are geared to large customers whose sites are conveniently clustered around one central-office facility. Not only does this exclude small business sites and telecommuting users, but it also leaves out large businesses that want ISDN connections among various sites outside their area, according to Bob Beman, ISDN product manager at US West.

A number of BOCs are preparing ISDN services to address this larger user population. Among the new capabilities being planned by one or more BOCs are the following:

- A site or user with limited networking needs will be able to order a single ISDN line instead of having to order a 20- or even 200-line ISDN Centrex service. Southwestern Bell Corp. is planning such an offering by year's end.
- ISDN connections will extend beyond the local central office to other areas: first within the BOC's region and then out to the interexchange carriers' ISDN services. Bell Atlantic Corp. and US West expect to roll out both

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INSIDE

OSF probed by feds, according to an industry report and third-party firms that say the Federal Trade Commission is looking at how the anti-AT&T Unix alliance prices the technology it buys from small firms. Page 93.

Product Spotlight — How to steer clear of dead ends when interconnecting local-area networks. Page 57.

IBM's reaction to Microsoft's plans for a 32-bit Windows is up in the air, according to industry sources who perceive a widening schism between the two. Page 4.

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6 Despite its **Nexrad** radar program being behind schedule and over budget, the U.S. Weather Service still elicits confidence from the federal government.

8 **NCR** continues to put up a fight against AT&T, filing antitrust suits and refusing cooperation with requests for its shareholder list.

10 Although it still falls behind Sun, HP and DEC in the workstation market, **IBM** is happy with its runaway sales of RS/6000s.

12 Thanks to Apple and AT&T Computer Systems, the **Macintosh** won't have to stand alone on the network much longer.

16 A bill supporting supercomputer development stands an excellent chance of becoming a law this year.

90 Computer technology has come a long way since Vietnam, as former data processing officer Gary Anthes can testify.

91 **Operation Desert Storm**'s successful defense can be largely attributed to its intelligent spy satellites.

92 The forces of war and recession — while taking a toll on **Wang**'s returning wave to profitability — could be its salvation, buying it time to meet deadlines.

Quotable

"I look at DEC as the perfect example of tremendous products and lousy marketing."

KEN KRALLMAN
CARLETON TECHNOLOGIES

On DEC's struggle to conform to the new realities of the computer industry. See story page 1.

SYSTEMS & SOFTWARE

25 Users are taking the slow boat to **Escon** architecture — which is fine, since its real power won't be available until later this year.

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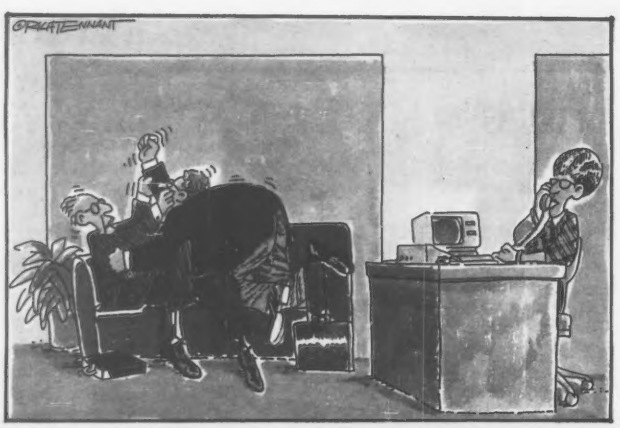


"THE TROUBLESHOOTERS FROM THE VENDOR AND THE PHONE COMPANY ARE HERE."

EXECUTIVE BRIEFING

■ **DEC's struggle to make the transition** from hardware seller to systems integrator is causing pain for both the company and its customers. But while DEC President Ken Olsen admits the process is "massive" and slow, users are sticking by the vendor. **Pages 1 and 89.**

■ **When IS projects fail,** it is often because top executives have mismanaged the relationship between the technology and its users. Management has to better define what is expected of technology and how user behaviors will change. It also has to think about the effect technology will have on middle management, which is where change will have the biggest impact. **Page 67.**

■ **Economies of scale** strike Wall Street's fancy as Prudential-Bache and Shearson Lehman confirm they are considering merging their back-office operations. Though the technical problems are large, the firms apparently believe the cost savings outweigh the risks. **Page 92.**

■ **The Open Software Foundation is being investigated** by the Federal Trade Commission for unfair trade practices, sources say. Independent software firms have been grumbling about the OSF's policies for dealing with them. **Page 93.**

■ **The drought of Unix applications** appears to be easing. Last week's Uniforum show featured imaging, multimedia software and computer-aided software engineering tools. **Page 93.**

■ **The Software Publishers Association is stepping up** its crackdown on businesses whose employees pirate software. Sites in Minneapolis, Seattle, Portland, Ore., and Norfolk, Va., will be raided over the next two weeks. **Page 1.**

■ **A rift between IBM and Microsoft** over personal computer user interfaces is widening. Sources say Microsoft is committed to enhancing Windows to be more OS/2-like, which goes against IBM's plans to promote an operating system upgrade. **Page 4.**

■ **Mainframe users are in no rush** to install IBM's Escon channel architecture. That's probably good because the biggest benefits of Escon will not be available until late this year. **Page 25.**

■ **The middle-of-the-road 386DX chip** is the odd man out of the PC race. Buyers seem to be opting for the lower end SX and more powerful I486 chips for their desktop needs. **Page 35.**

■ **Northern Telecom regroups** after failing several times to make a go of the end-user data networking market. The firm's new focus is on central-office equipment and a single customer premises product. **Page 47.**

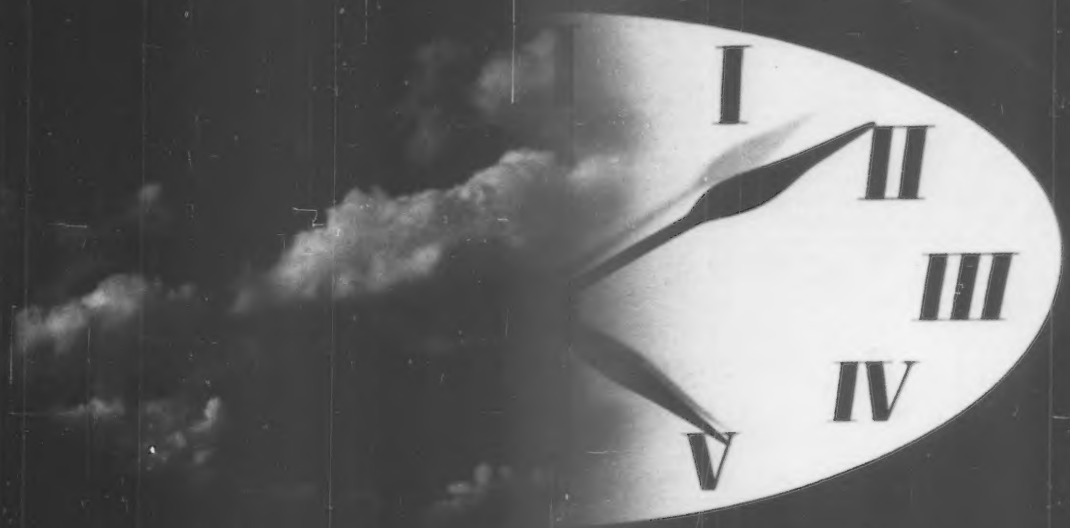
■ **Data General surprises Wall Street** with a $12 million quarterly profit, but Wang slips back into the red, which prompts more rumors of layoffs. **Page 92.**

■ **Some physicians are discovering that voice recognition** is the cure for emergency room paperwork. Technology improvements have cut down on errors and have freed doctors' hands for more important business. **Page 20.**

■ **How do you find a job** after a year-long hunt? One IS professional who's been there says the key is to specialize and find your skills niche. **Page 74.**

■ **On-site this week:** World Vision catches open systems fever, ditching a proprietary setup, switching to Unix and giving corporate sponsors a window on its own database. **Page 27.** A sports apparel maker hopes that equipping its sales force with laptop computers will reduce the volume in those marked-down bins of extra large sweatshirts in the campus store. **Page 35.** The University of California at Santa Cruz reaps the benefits of IBM's and DEC's Project Athena scalable software but puts it on less expensive Sun workstations. **Page 37.**

SYNCSORT. MASTERS OF INNOVATION



Announcing Support for System/390*

Whether the innovation is in hardware or software, Syncsort masters it.

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OS/2 partners hit roadblock

BY PATRICIA KEEFE
CW STAFF

Microsoft Corp.'s relentless Windows drive has forced IBM between a rock and hard place, according to knowledgeable sources who said the two hit an impasse last week. "They are diametrically opposed," one source said.

Why? Because IBM has millions of dollars and a lot of end-user faith invested in the survival of OS/2's Presentation Manager interface. It functions as a unifying thread in Officevision and AIX, and Open Software Foundation/Motif look and feel was modeled after Presentation Manager.

However, sources briefed by Microsoft recently are equally convinced Microsoft will not accommodate the Presentation Manager graphical user interface at the expense of Windows.

During the last two months, sources explained, Microsoft has dropped the artificialness of two separate products targeting separate needs. It has forged ahead with plans to extend the functionality of Windows into the 32-bit arena, incorporating key OS/2 features. There are even plans to move beyond into an applications server operating system. In fact, Microsoft reportedly expects that when pitted against Unix, this server operating system will garner 15% to 20% of the market.

Specifically, OS/2's functions will be absorbed into a 32-bit Windows, which may or may not support 16-bit OS/2 calls. Portable OS/2, which will be renamed, is expected to feature a lot of minicomputer-style services. A separate module that may or may not be bundled will allow OS/2 Extended Edition applications to run on it, sources said.

"Microsoft is honestly trying to provide a coherent message to reposition Windows over time, and OS/2, for what they feel will address the majority of the market's needs," said David Cearley, an analyst at Gartner Group, Inc.

Yet if Microsoft continues to push an enhanced Windows at large accounts and independent developers, then "it's an absolute fantasy" for IBM to think it can push OS/2 on the client, Cearley said.

Avoiding commitment

Microsoft has also backed away from promises of binary compatibility between OS/2 and Windows. For now, users and developers must make do with the Windows Libraries for OS/2, which provides tools for linking Windows applications to OS/2.

IBM, meanwhile, is forging ahead with plans to release a 32-bit OS/2 in December.

Microsoft will publicly outline its position at a briefing tomorrow in Bellevue, Wash., most likely couching it in terms of a response to market demands, sources said. Afterward, industry observers and users alike will await IBM's response. As of late last week, no response had been formulated, sources close to IBM said.

In an effort to win IBM's support, Microsoft met with IBM's OS/2 executives last week. "IBM and Microsoft [went] at it hammer and tongs," a briefed source said. "I don't think [Microsoft] fully understands the depths of IBM's feelings of animosity and betrayal toward them," another source said.

Despite having two opposing agendas — Microsoft's personal computer-centric views vs. IBM's need to support host attachments — the two will likely try to avoid an all-out clash, predicted Frank Dzubeck, a consultant at Communications Network Architectures.

CICS pact announced

BY JEAN S. BOZMAN
CW STAFF

SUNNYVALE, Calif. — Boole & Babbage, Inc. said last week that IBM had asked the $94 million Silicon Valley company to develop performance management products for IBM's CICS teleprocessing products.

IBM confirmed the technology agreement but declined to give details. Boole & Babbage said it has agreed to work with IBM's CICS development laboratory in Hursley, England.

Jack van Kinsbergen, Boole & Babbage's chief technical officer, said the future products would help information systems managers at IBM mainframe centers gain control over ever-widening distributed data networks. The CICS subsystem, which directs network requests to mainframe applications, currently lacks utilities that would automatically balance the work flow, van Kinsbergen said.

Cooperative processing applications that link hundreds of OS/2 machines with active CICS "regions" also need to be closely monitored to prevent system slowdowns.

The new Boole & Babbage products, which will appear over a multiyear period, are intended to aid systems operators in preventing system bottlenecks.

"As users build CICS applications that span multiple [hardware] platforms, the people in the data center need to be able to manage that environment," van Kinsbergen said.

Go releases pen-based operating system

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — On the eve of the birthday anniversary of the man with the most famous signature in the U.S. — John Hancock — Go Corp. announced Penpoint, its handwriting-based operating system for notebook computers.

However, a demonstration showed that "John Hancock" could easily be mistaken for "John Hedgehog."

Three hardware companies, Grid Systems Corp. in Fremont, Calif., IBM and NCR Corp., have promised notebook systems using Go's operating system. Grid said prototypes of the computer would be available late this year. IBM and NCR had no definite dates for availability.

Norman Vincent, vice president of data processing at State Farm Mutual Automobile Insurance Co. in Bloomington, Ill., is working with IBM to develop a pen-based system to estimate automotive repairs. He said the potential market for these computers at State Farm alone is 30,000 agents and adjusters.

While users and analysts said they see a huge market looming for the computers, pen-based software will be dogged by its inability to recognize handwriting. "The handwriting translation is not perfect," conceded Robert Carr, vice president of software at Go, after the software mistook his careful printing of "simple" for "gimple" at a demonstration.

Go's operating system will soon be competing with Pen Windows, a pen-based extension to the next version of Microsoft Corp.'s Windows.

Despite impending competition, IBM's licensing of Penpoint will "give Go a tremendous boost," said Tim Bajarin, an analyst at Creative Strategies Research International, Inc. in Santa Clara, Calif. He added that IBM will not necessarily be burning business partner Microsoft by backing Go. "There will be a choice of operating systems."

Pac Bell integrates Windows into Starlink user interface

BY MAURA J. HARRINGTON
CW STAFF

SAN RAMON, Calif. — After denouncing Microsoft Corp.'s graphical user interface last year, the information systems department at Pacific Bell has begun integrating Microsoft's Windows 3.0 into its 3-year-old, homegrown Starlink user interface.

Michael Evans, technical director of the user interface development group of the customer service automation project, said the department changed its mind and decided to adopt the software giant's upgraded version of Windows despite onetime criticisms that Windows, then in Version 2.0, was too slow.

Starlink is a generic windows-based user interface management system built to support Pacific Bell's disparate protocols and its simultaneous IBM 3270 and Digital Equipment Corp. VT100 terminal emulations.

"[Windows] 3.0 was a major breakthrough as far as we are concerned. It made a quantum leap in terms of its performance and ... it became incredibly cost-effective to spread throughout the company," Evans said.

Events that spawned the decision included the expansion of Pacific Bell's Starlink user base, making Starlink the company-wide user interface standard rather than reserving it exclusively for the customer service representatives, according to Evans.

Jeff Ironfield, an associate systems analyst and project leader for the Windows conversion project at Pacific Bell, said cost-effectiveness was one of the key reasons to include Windows 3.0 in the decision.

"I think the commercial software industry is actually catching up [to corporate in-house IS shops]. So we're beginning to look at how we can integrate some of these applications into our system where they are needed," Ironfield said, adding, "After all, we're in the phone business first, not the software business."

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"To get SQL, they said I'd have to walk away from 20 years, millions of dollars and start all over again. I told them to go fish and today, I have navigational and relational technology together, in a single database. They said I couldn't do it, but who listens to them anyhow?"

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ISDN

FROM PAGE 1

types of ISDN interconnect services by year's end.

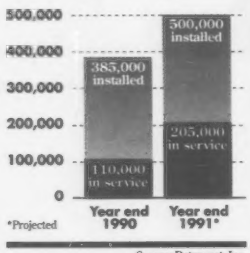
• Primary Rate Interface ISDN services that support 23 64K bit/sec. B channels plus a separate 16K bit/sec. D channel. Currently, most BOC services support the Basic Rate Interface of two B channels plus a D channel. Pacific Bell already offers Primary Rate Interface services; Bellsouth Corp. plans to tariff a Primary Rate Interface service in the third quarter.

Behind these developments is a recent agreement among various industry players to use a limited subset of ISDN specifications rather than waiting for the leading switch vendors to implement the full standard. While the original deadline for full standard support was this month, the switch vendors acknowledged last spring that 1993 was a more likely time frame.

Late last year, AT&T, Siemens AG and Northern Telecom, Inc. committed to implementing an ISDN subset, called Year 0, on their switches by first-quarter 1992. This will allow BOCs to set up ISDN links between their central offices even if different offices uses different brands of switch.

Crucial year

Although many installed lines are still not being used, the use of Integrated Services Digital Network could almost double in the U.S. this year



Source: Dataquest, Inc.
CW Chart: Doreen St. John

Extra! Extra!

This is good news for several business users whose long-term telecommunications strategies are built on ISDN's ability to deliver flexible amounts of voice, data and video bandwidth from one user desktop to another — even if those desktops happen to be in remote locations.

For example, Schindler Elevator Corp. is already setting up overseas ISDN links and plans to roll out ISDN Basic Rate Interface connections to its U.S. sites as soon as the BOCs make them available, according to Edward Hodgson, manager of computing and communications. Among the applications Schindler hopes to implement are "screen sharing for programmers working at home" and automatic call-up of customer data on service representatives' terminals.

Hardee's Food Systems, Inc. wants to use local Basic Rate Interface services to connect restaurants in 42 states to its seven regional data centers for polling purposes, said Martin Jackson, director of telecommunications at the Rocky Mount, N.C.-based firm. After a 14-month trial of this application, Hardee's "thinks it will be a winner," Jackson added. However, Hardee's rollout plans await a broader ISDN rollout from the BOCs.

ISDN services will never take off until the technology is available wherever users want it, industry sources said. At the end of last year, only 110,000 ISDN Basic Rate Interface lines were in service across the U.S., according to Dataquest, Inc. (see chart below).

It is true that Year 0 only supports ISDN services on a limited basis, analogous to "a dune buggy without fenders or doors," said Ted Shelton, Bellsouth's ISDN operations manager. However, that stripped-down buggy will be able to carry such key applications as voice-data integration, video and desk conferencing, links between personal computers, PC-to-host links and local-area network interconnectivity, he added. IBM threw some more of its weight behind ISDN last week with the announcement of several products.

More significant, however, was the announcement that users will be able to use local ISDN services to access IBM's Information Network value-added network service, according to Thomas Nolle, president of Voorhees, N.J.-based research firm CIMI Corp.

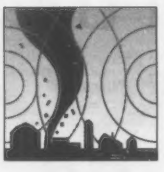
The ISDN connection will provide most users with access to the Information Network at 19.2K bit/sec. rates — twice the present speed supported, IBM said. Personal System/2s equipped with the new ISDN interface card can attain the full 64K bit/sec. speed of an ISDN B channel, according to IBM spokesman David Hart.

Weather agency shakes up tardy radar project

BY JIM NASH
CW STAFF

The U.S. government continues to express confidence in its weather prediction capabilities, despite financial, technical and personnel setbacks for its new radar program.

However, controversy continues to roil over the U.S. Weather Service's next-generation computerized radar program [CW, July 16, 1990], commonly referred to as Nexrad. Sam Williamson, administrative leader for much of the program, said a major reorganization of the program is being considered.



Williamson was scheduled to complete a two-week leave from Nexrad last week and is awaiting reassignment to another project. Government reports last summer indicated that Nexrad is at least six months behind schedule and $80 million over budget. Williamson answered criticisms of his three-year tenure by saying, "I cannot be an incompetent manager and still get outstanding ratings every year."

Nexrad, which encompasses the installation of new radar systems at 175 weather stations, is currently expected to cost almost $450 million rather than the planned $359 million. The project is supposed to offer meteorologists a look at violent and distant storms, far exceeding conventional radar systems.

Gray Castle, deputy undersecretary at the U.S. Department of Commerce, verified that program changes are being discussed. Williamson said Nexrad might be run from the Department of Commerce, which is funding the project with the U.S. Air Force and the Federal Aviation Administration.

At the same time, Nexrad officials are busy putting out other grass fires. Since last year, the project's prime contractor, Unisys Corp., has been trying to overturn the government's decision to invoke a contract clause requiring Unisys to proceed with full-scale production. Unisys has claimed that the project does not have multiyear funding authorization from Congress.

A spokesman for Unisys acknowledged that the company is requesting more money to pay for corrections and enhancements required to get Nexrad past earlier flaws.

Separately, Weather Service employees contacted by the press claimed that a work-force reduction policy of attrition has left the agency short by hundreds of employees.

Frame relay turbocharges public data network services

BY ELLIS BOOKER
CW STAFF

Public data networks will get considerably faster this year as value-added network providers begin to deploy frame-relay services.

Both Compuserve, Inc. and U.S. Sprint Communications Co. announced their intention to use frame relay — a turbocharged packet protocol — on their public data networks. The services will become commercially available by the end of the year and by the end of the third quarter, respectively. Meanwhile, BT Tymnet, Inc. will announce its frame-relay service this week at the Communications Networks '91 show in Washington, D.C., a spokesman confirmed last week. Tymnet's commercial service will be ready in the second quarter, he said.

Frame relay is much faster than the ubiquitous X.25 packet protocol because it does away with error checking and correction at each node in a network. More significant for users, however, is the fact that the frame relay permits a much more seamless interconnection of local-area networks across wide-area networks.

Up until now, public networks have been too sluggish to support LAN-to-LAN connections, according to Richard J. Malone, principal at Vertical Systems Group in Dedham, Mass., who said users have had few options to building private networks.

"Today, to transmit one [data] packet coast-to-coast through an X.25 network — assuming four to six hops — takes about one second," Malone said. By comparison, a frame-relay network could send the same data in 6 msec, he said.

Another driving force behind frame relay, Malone and others said, has been the increasing interest in document imaging.

"We think our business will shift to being a LAN/WAN networking company," said Andrew S. May, director of marketing at Compuserve's Network Services data network unit.

Sprint's Data Group, which sells its packet network services, said last week that its frame relay service would achieve commercial status by the end of the third quarter. A company spokeswoman said the Sprint X.25 packet switches will be modified through software to support the protocol, which will be deployed ubiquitously through the Sprint network.

More releases

Sprint also released a frame-relay service specification to makers of customer premises equipment last week and said it would have a certification testing program for the vendors.

The announced frame-relay services all require customers to use dedicated data lines to the WANs nearest frame-relay node. Switched virtual circuit access into a frame-relay network is technically feasible but has not yet been addressed by the standard and is two or three years away, industry observers said.

DEC unveils VAX 4000

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. accelerated its drive toward small-business customers last week with the introduction of the VAX 4000 Model 200, a low-end deskside system that replaces the Microvax 3400 — doubling its performance for the same price.

"The 'gotcha' on this box is that it is not upgradable" to the more-powerful VAX 4000 Model 300, said Terry Shannon, an analyst at International Data Corp. in Framingham, Mass. Microvax customers, however, will be able to upgrade their 3000-class machines to the Model 200 at $15,000 for a server configuration or $21,000 for a time-sharing model.

DEC also rolled out lower-priced storage technology for the VAX 6000 midrange line and promised to deliver a high-performance Fiber Distributed Data Interface (FDDI) adapter for the VAX 6000s this spring. The ability to directly connect high-speed FDDI to the XMI bus on the VAX 6000 would boost the midrange machine's abilities in transaction processing and imaging applications.

The new storage products, delayed for several months because of technical problems, are based on Digital Storage System Interconnect (DSSI) technology. Moving DSSI onto the midrange gives users who need to cluster VAXs together a 40% savings over Computer Interconnect devices.

DEC acknowledged that the VAX 4000s will take a bite out of midrange sales, except in cases where customers need VAX 6000 capabilities.

"If I was going out and buying a machine for most server applications, I wouldn't look at the 6000s," said Kevin Obermann, a network manager at Lawrence Livermore Laboratories in Livermore, Calif., which is installing two VAX 4000 Model 300s to replace 8000 series hardware.

DEC said a fully configured VAX 4000 Model 200 will cost between $21,000 and $33,000.

Oracle sets client/server OLTP performance records

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NEWS SHORTS

Understanding Officevision

The twice-delayed Officevision Release 2.0 is being held up because of its complexity and lack of diagnostic tools, IBM executives said at a briefing last week. "The LAN adds levels of complexity," said Tony Mondelo, vice president of office systems development. Another factor was trying to integrate Officevision's approximately 13 modules. "As we brought all the applications together and integrated them, we underestimated how the system would react. That's the truth. That's why we missed the date," Mondelo said. He refused to say when the software will be ready. "We've learned our lesson; we're just not going to predict anymore."

AD/Cycle tool also delayed

IBM confirmed last week that it has delayed shipment of Developmate, one of the few IBM-made products for its AD/Cycle strategy, until March. Delivery of this prototyping tool, which was supposed to have shipped by year's end 1990, was put off because customer feedback was not satisfactory, a spokesman said.

Oracle wallets look thin

Oracle Corp. is giving discounts to customers who place large orders and then pay in cash a few days later. The move, disclosed by Oracle's top executives at a briefing last Friday, is part of a rush to build up Oracle's dwindling cash reserves. Geoff Squire, president of Oracle's world sales division, told analysts that Oracle's cash on hand has been as low as $15 million, down from $50 million in late November. At the same time, Oracle executives outlined a stark cash position: They have just $5 million left to spend in their $170 million line of credit, financed by a world banking syndicate, and they face an independent audit of their accounts receivable.

Andersen, Microsoft team up

Andersen Consulting and Microsoft Corp. said last week they would join forces in providing systems integration services for customers developing client/server applications. Andersen will become a reseller of Microsoft products as part of its systems integration engagements. In addition, Microsoft's Information Technology Integration Services Group will work with Andersen on some joint projects.

Sun up, but cautious on outlook

Noting that "obvious external factors" — that is, the Gulf war and the economy — could affect near-term demand for Sun Microsystems, Inc.'s products, the company released a profitable second-quarter report last week. Sun reported revenue of $753.5 million this quarter, up from $595.4 million for the comparable quarter last year. Net income grew by $18.9 million from last year's second quarter, to $39.1 million.

New York Life promotion

New York Life Insurance Co. last week named Julia A. Romano as a vice president in the information systems and services department headed by Senior Vice President Thomas Pettibone. Romano, a 25-year veteran at the company, has worked in IS since 1966 and became a corporate vice president in 1980. She replaced Robert Hollinger, who resigned late last year.

SEA sues Mobius

Software Engineering of America (SEA) last week filed suit against Mobius Management Systems, Inc., charging Mobius with making "materially false and disparaging remarks about SEA products." SEA and Mobius compete in the report management market. The suit, which was filed Friday in Manhattan Federal Court seeks undisclosed damages. A Mobius spokeswoman said she was not aware of the suit.

More news shorts on page 92

NCR files antitrust suit, loses its shareholder list

BY MICHAEL FITZGERALD
CW STAFF

DAYTON, Ohio — An antitrust suit filed against AT&T by NCR Corp. last week was seen by analysts as little more than a delaying tactic in its struggle to remain independent from the giant telecommunications firm.

Meanwhile, in a separate case, a federal judge ruled that AT&T is entitled to NCR's shareholder list. NCR had been refusing to give the list to AT&T.

NCR's suit claimed that the combined companies' share of the commercial Unix application-specific integrated circuit and certain sectors of the telecommunications and on-line transaction processing markets would constitute a monopoly. According to NCR's suit, the two companies combined have a 40% market share for commercial Unix systems that cost less than $100,000 — their best combined market.

More than enough

The suit was filed the day after AT&T presented NCR with written requests for a special meeting of NCR's board from 51% of the computer maker's shareholders. AT&T needed only a 25% vote to mandate a special meeting.

AT&T, which has cleared antitrust reviews under the U.S. Hart-Scott-Rodino Act, the Canadian Competition Act and the European Community's Merger Regulations, issued a statement saying it believed the antitrust allegations were without merit.

One legal scholar concurred. "NCR has one enormous problem that has nothing to do with these markets: It will be the beneficiary of these monopolistic practices if they occur," said Herbert Hovenkamp, professor of law at the University of Iowa and an antitrust law specialist. Hovenkamp said most federal courts rule that the beneficiary of an alleged monopoly cannot sue an aggressor, but he added that the 6th Circuit U.S. Court of Appeals, which has jurisdiction in Ohio, has allowed such suits to stand trial in the past.

Meanwhile, NCR has yet to respond to the requests for a special meeting and is under no obligation to do so, according to analysts, except that it must call one within a "reasonable" period of time. NCR also issued a strong denial of published reports that its resolve in the struggle might be slipping.

Merger scorecard

During the past two weeks . . .

- AT&T said more than 70% of NCR's shares have been tendered, and it will extend its tender offer until Feb. 15.
- AT&T has also asked to convene a special meeting of NCR's board for the purpose of removing the board members. AT&T said it has more than twice the required 25% of NCR shareholder requests it needs to convene the meeting.
- At the special meeting, AT&T could only remove a majority of NCR's board if 80% of the stock is voted against the board. However, four of NCR's 13 board members are up for re-election at NCR's annual meeting on April 17. A 51% vote would be needed to oust them.
- NCR filed a complaint charging that AT&T's credit card business makes it a bank holding company and prohibits it from buying a nonbank holding company.
- NCR filed an antitrust suit against AT&T charging that the combined companies would dominate certain markets.
- A New York court told NCR to give AT&T its stockholder list.

IBM

FROM PAGE 1

Strategies Corp.

"This is clearly another step in ICC's attempt to gain account control," said Shao Wang, an analyst at Smith Barney, Harris Upham & Co. Even if IBM's allegations are correct, said Patrick Burton, an analyst at Piper Jaffray & Hopwood in Minneapolis, "there could be some antitrust actions" if IBM can prevent third parties from subleasing IBM machines.

An IBM spokeswoman said IBM is determined to stop Comdisco from "illegal" activity that has gone so far as to result in bidding wars between the two, in which IBM is bidding against its own "misappropriated" parts.

IBM maintained that a customer must return a leased asset in the exact condition in which it was originally leased. This means if a customer were to make any changes during a leasing period that resulted in a different, although equivalent, system configuration, it would be in violation of the lease.

Jim Matsey, corporate director of information systems at Reynolds Metals Co., said he stopped leasing equipment because of these restrictions. "We buy because there were too many restrictions placed on the hardware," he said.

Kenneth A. Bouldin, president of the Computer Dealers & Lessors Association (CDLA), issued a statement saying that IBM began enforcing replacement part provisions one year ago, and CDLA views its actions as "an unreasonable restriction that not only affects CDLA members . . . but more importantly, penalizes lessees of ICC-owned machines."

Between-lease changes

Changes that could occur during a lease period include upgrades, replacement parts from a third-party source and subleasing activity. Often, existing parts are taken out and re-leased, either by the customer or by a third party, Gens said.

However, once the lease expires, a customer must return equipment with the exact IBM parts that were originally shipped with the machine. This could become an almost impossible task if equipment went out to the leasing market and moved about through several customers during the time period of the original customer's lease.

The IBM spokeswoman said IBM does not accept equivalent configurations when assets are returned because it could put IBM at risk. "It's not acceptable, because when IBM gets the asset back, we have no idea where those parts have been nor do we know if we have clear title to them," the spokeswoman said.

She said IBM first suspected Comdisco of "illegal" activity in 1989 because of "anecdotal evidence." IBM saw an increase in activity last year when it liberalized its leasing terms and conditions.

At that time, IBM announced that ICC customers could sublease parts of a system in addition to a complete system. Previously, customers were only allowed to sublease an entire system. They were also allowed to modify a system by adding third-party products such as memory upgrades.

However, in all cases, a customer must receive IBM approval for its activity and must ensure original parts are with the system when it is returned to ICC.

Senior Editor Nell Margolis and Midwest Bureau Chief Ellis Booker contributed to this report.

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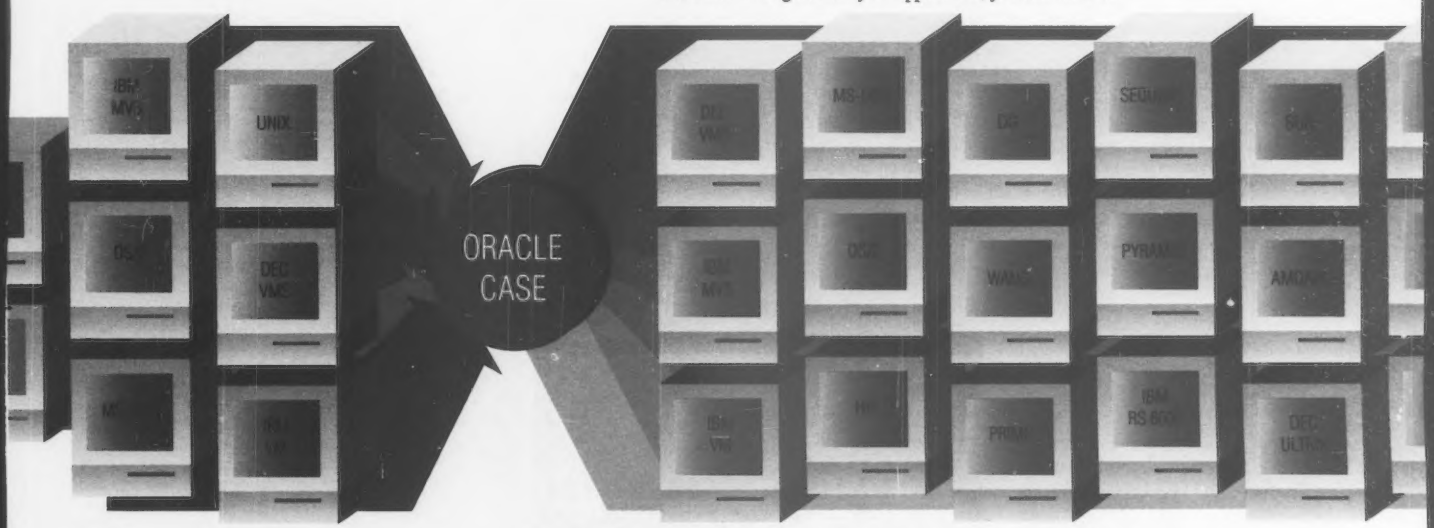

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RS/6000 shipments soar

BY MARYFRAN JOHNSON
CW STAFF

DALLAS — IBM boasted last week about the runaway success of its RISC System/6000 workstation line, which company officials said moved 25,000 machines during the past six months and raked in $1 billion in 1990 revenue.

In their most optimistic scenario, industry analysts had predicted that IBM would ship only 15,000 of the Unix-based Powerstations and Powerservers. Even with its unexpected success, however, IBM is still in fourth place in workstation market share.

The No. 1 workstation vendor is still Sun Microsystems, Inc., with a 38% market share and 141,800 machines shipped last year, according to figures from Framingham, Mass.-based market research firm International Data Corp. (IDC).

Hewlett-Packard Co. took second place with a 20% share of the market and 75,550 systems shipped, while Digital Equipment Corp. is third in line with 17% of the market and 62,500 workstations shipped in 1990.

"It's clear they have momentum, and I think [IBM] will ship 50,000 workstations and servers in 1991, plus another 10,000 to 20,000 multiuser systems," IDC analyst Vicki Brown said.

"Open systems is the future, and IBM's future is in open systems," said C. Michael Armstrong, president and chairman of IBM World Trade, during an address at the Uniforum show last week.

Counting loaner and demonstration machines, Armstrong said IBM actually shipped 40,000 of its new Unix boxes last year. He said the company will address users' demands with delivery this year of greater performance for high-end systems, new entry-level desktop models and improved graphics capabilities.

Building more integrated software packages with a "common look-and-feel" interface is a primary goal of the workstation division, company officials said.

The success of the RS/6000 came as no great surprise to Equitable Real Estate Investment Management, Inc. in Atlanta, which is migrating from Wang Laboratories, Inc. minicomputers to distributed RS/6000s in more than a dozen regional offices nationwide.

"From a business standpoint, the price/performance is getting us a lot more power per dollar from the RS/6000 than from our 3090 mainframe," said Equitable Senior Vice President Robert E. Matthews.

The RS/6000 also scored a hit in corporate America last week with the announcement that it will join Unix-based workstations from DEC in a worldwide General Motors Corp. information systems project.

"Our overall aim is to connect GM around the world — 100%," said Ruth Stanton, a GM spokeswoman in Detroit. "Each Unix server will be attached to 40 desktops in an office and another 10 desks in an engineering area."

IBM workstation to manage nets

BY JOANIE M. WEXLER
CW STAFF

Souped-up wide-area networking technologies will cause IBM to tap the power of its RISC System/6000 workstation to run a mainstream network management product for the first time, the company said in a statement of direction last week.

The network management system for the vendor's forthcoming T3 multiplexers is slated to run on the RS/6000, which uses IBM's version of the Unix operating system, AIX.

T3 multiplexers concentrate multiple data or voice signals onto a single wide-area 45M bit/sec. circuit — a performance leap over widespread existing T1 networks that run at 1.5M bit/sec. T3 and other high-speed technologies are quickly cropping up because of the growing need to interconnect high-speed local-area networks over wide areas with a modicum of performance degradation.

IBM, which has resold Network Equipment Technologies, Inc.'s (NET) IDNX line of T1 multiplexers since 1987, said it plans to start reselling NET's IDNX/90 T3 multiplexer in June under its own label. However, the company would not pinpoint a time frame for the accompanying network management system.

"Officially, within IBM, a statement of direction means 'within two years,'" IBM spokesman Dennis Drogseth explained. "But this will not be one of those cases where we barely make the deadline. We can't have products available with no management for very long."

Drogseth pointed out that most network management products run on IBM Personal System/2s, which use IBM's OS/2 multitasking operating system, but added that T3 technology "requires the power of the AIX platform."

In a pinch, NET's Series 5000 network management system could be swapped in to manage the T3 gear, according to Karyn Mashima, vice president of corporate marketing at NET. She added, however, that "IBM isn't likely to ship a product with no management."

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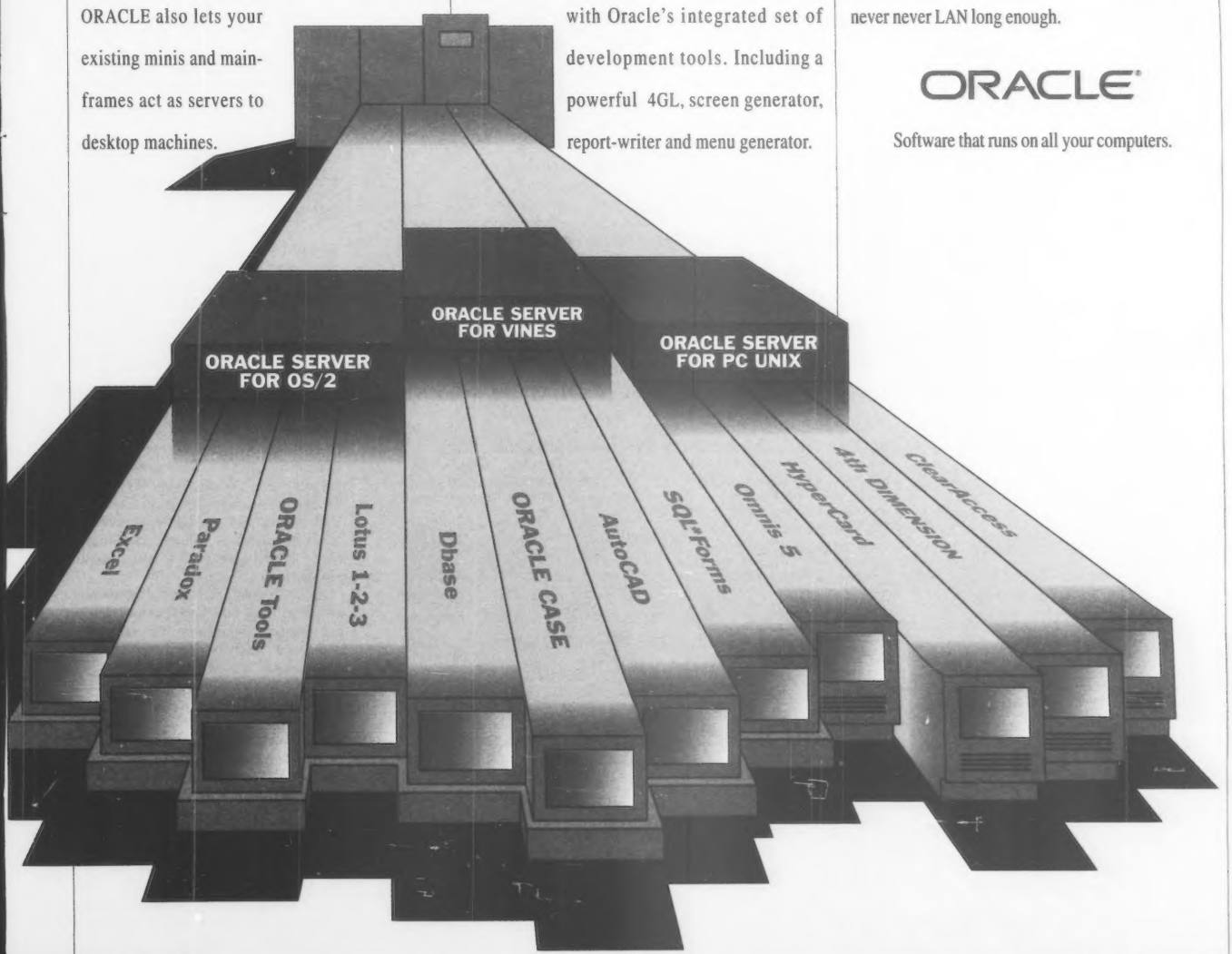

Macintosh joins Unix System V-based networks

BY JOANIE M. WEXLER
CW STAFF

DALLAS — Long the wallflower of the corporate network, Apple Computer, Inc.'s Macintosh will likely get chummier with its MS-DOS and OS/2 peers because of a move from AT&T Computer Systems and Apple at last week's Uniforum trade show.

The two vendors have opened up an application programming interface (API) to third-party developers that will ultimately allow organizations with islands of stand-alone or networked Macintoshes to integrate Macintosh, DOS and OS/2 clients on one network running a Unix System V, Release 4 server.

An API defines how an application — such as a spreadsheet or word processing package — talks to communications software. The use of standardized APIs allows applications to be developed independently of the underlying method of communication.

AT&T has already implemented the API for Appletalk — Apple's proprietary networking architecture — in its Stargroup Server for Macintosh Clients, which is part of the company's Stargroup LAN Manager Server network operating system.

AT&T will now allow developers of other servers running Unix System V, Release 4 to use the API in designing applications that can be accessed by Macintosh, DOS and OS/2 clients on one network using the interface and commands native to the client operating system.

Even without AT&T

One user running AT&T's Stargroup Server for Macintosh Clients said the move should "bring all the things I like about my Mac serving to anyone who doesn't happen to have AT&T hardware."

Bernard Hecker, director of academic computing at Trinity College in Hartford, Conn., commented that "if you're doing all your serving in one server, you only need one set of disks, printers, backups and eventually electronic mail. That's a leap in efficiency and integration."

The first release of Unix System V, Release 4 Appletalk APIs will be on NCR Corp.'s System 3000, according to AT&T.

New horizons for Unix group

BY SALLY CUSACK
and JOHANNA AMBROSIO
CW STAFF

DALLAS — Unix International, an AT&T-backed association of Unix System V users, vendors and developers, announced a program last week that will establish an umbrella architecture for developing open system software environments that will operate in conjunction with Unix System V, Release 4.

Dubbed the Open System Architecture, the program extends Unix International's interests beyond the core Unix operating system. It defines three major areas of computing:

- Distributed computing, for addressing end-user needs for transparent networking, data transfer functions and software interoperability within a heterogeneous environment.
- Corporate hub computing, which will target mission-critical applications.
- Desktop computing, which focuses on connecting desktop users to any service resident on the network.

Keeping up with X/Open

The Open System Architecture will maintain compatibility with X/Open Corsortium Ltd.'s Common Application Environment and will reportedly allow any software developer to produce industry-standard products compliant with X/Open's Portability Guide.

Unix International's decision to broaden its technology base "is a sign that Unix International and the Open Software Foundation are as competitive as ever and that any possible merger between the two probably won't occur," said Wayne Kernochan, a senior analyst at Boston-based The Yankee Group. The comment was made in reference to persistent rumors that the rival Unix groups would eventually join forces.

David Sandel, vice president of marketing at Unix International, noted, "I'm not worried about what the critics say about our motives. We have a proven track record with [Unix] System V, [Release] 4, and our distributed computing strategy will be compatible with [IBM Systems Application Architecture], Decnet and OSF's DCE. And the graphical user interface will not necessarily be Open Look."

"There's a mistaken perception that we're in that camp," Sandel added, "but we don't have an issue with Motif. Many of our members have implemented it. The industry needs a virtual [application programming interface] to develop both Open Look and Motif applications without having to write new code. We're looking for a longer range solution."

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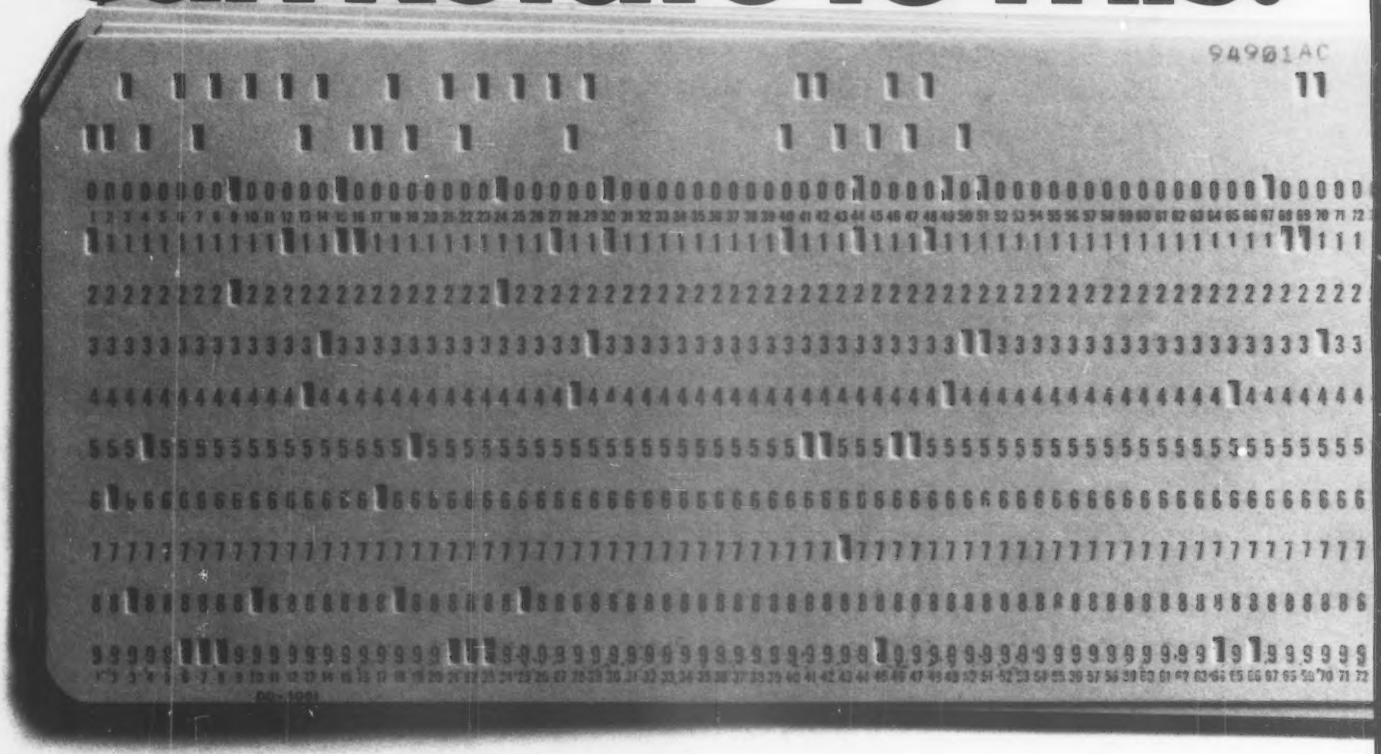

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HEWLETT
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Path smoothed for Mac clones

Nutek claims chip engineering method is legally sound

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — A small Silicon Valley start-up will test the mettle today of Apple Computer, Inc.'s tenacious refusal to permit Macintosh clones.

Nutek Computers, Inc. plans to unveil what has been called a cleverly engineered hardware and software strategy, one that it claims will allow manufacturers to legally produce personal computers that are functionally indistinguishable from the Macintosh.

Nutek President Benjamin Chou said that by the end of the year he will begin shipping the chip set, operating system and screen display needed to manufacture functionally equivalent Macintosh clones. If successful, analysts said, the move against the proprietary Apple architecture could dramatically widen the Macintosh side of the PC market in much the same way that cloning IBM Personal Computers has created a multibillion dollar international industry.

"Nutek will do for Mac users what the first IBM-compatible developers did in the early 1980s: open up the market to increased innovation and competition by enabling major independent third-party manufacture," Chou said from an office located only a few miles from Apple's corporate headquarters.

Apple officials said they have neither seen nor evaluated the Nutek product and refused to comment.

Chou said his firm will slip through Apple's legal noose because of its "clean-room" development methodology, a two-year effort through which Nutek engineers built a read-only memory (ROM) chip from only publicly available sources and without references to the Macintosh's internal code. The ROM chip contains a copyrighted program that controls the basic hardware operations and standardizes the user interface.

Additionally, Chou said, he will neatly sidestep the look-and-feel screen appearance lawsuits that Apple leveled against Microsoft Corp. and Hewlett-Packard Co. because Nutek's user interface is based on the Open Software Foundation's OSF/Motif interface.

So far, no independent supplier has legally and successfully developed a Macintosh-compatible operating system and user interface, although Sony Corp. and Apple are reportedly producing a notebook PC incorporating Apple ROM chips. The only solution now available is produced by Boulder, Colo.-based Outbound Systems, Inc., but it requires users to cannibalize ROM chips from Macintoshes and place them in an Outbound system.

Analysts said that although Apple is likely to file a copyright or patent infringement suit, Nutek has its defenses in place. "Their approach to handling the look-and-feel issue is ingenious," said Tim Bajarin, an analyst at Creative Strategies Research International, Inc. in Santa Clara, Calif. "The real nitty-gritty is whether Nutek's ROM chips are truly clean-room developed. If they are, we've got a legal solution to cloning the Mac."

Some observers said Nutek has a good chance of prevailing because its actions are analogous to those of Chips and Technologies, Inc., whose successful replication of the chip sets of the IBM PC led to aggressive cloning.

Analysts said Apple will most likely not wield a big legal stick until after the chip set and software ships, but Nutek could face OEM reluctance in the meantime. Nutek officials said they will indemnify OEMs from any copyright infringement relating from an Apple suit.

Network bill in Congress

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — A bill that would establish a multigigabit/sec. National Research and Education Network and foster the development of new supercomputers has a good chance of becoming a law this year, sources said last week.

The bill, which was introduced in the U.S. Senate and the U.S. House of Representatives last week, authorizes $988 million over five years to the National Science Foundation and the National Aeronautics and Space Administration for the National High-Performance Computing Program.

The bill's supporters would seek to get an additional $1 billion for the Defense Advanced Research Projects Agency and the U.S. Department of Energy — the other chief participating agencies — through separate legislation.

Last year, a similar bill, introduced by Sen. Albert Gore Jr. (D-Tenn.), was passed unanimously by the Senate but was not taken up in the House [CW, Dec. 24/Jan. 1]. A Senate staff member said the bill's chances of passage through the House this year are greatly enhanced by its having Rep. George Brown (D-Calif.) as its key sponsor on the House side. Brown is chairman of the House Committee on Science, Space and Technology.

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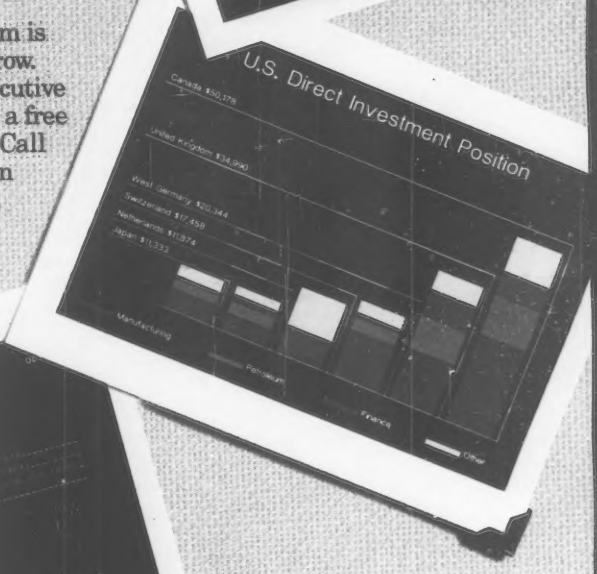

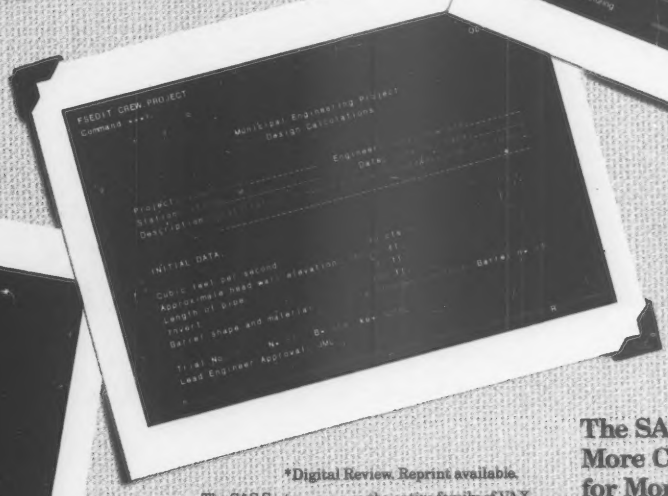

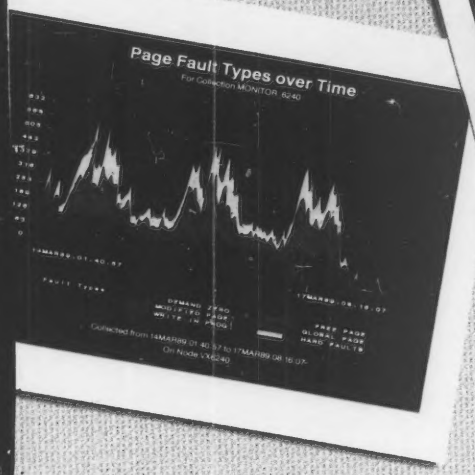

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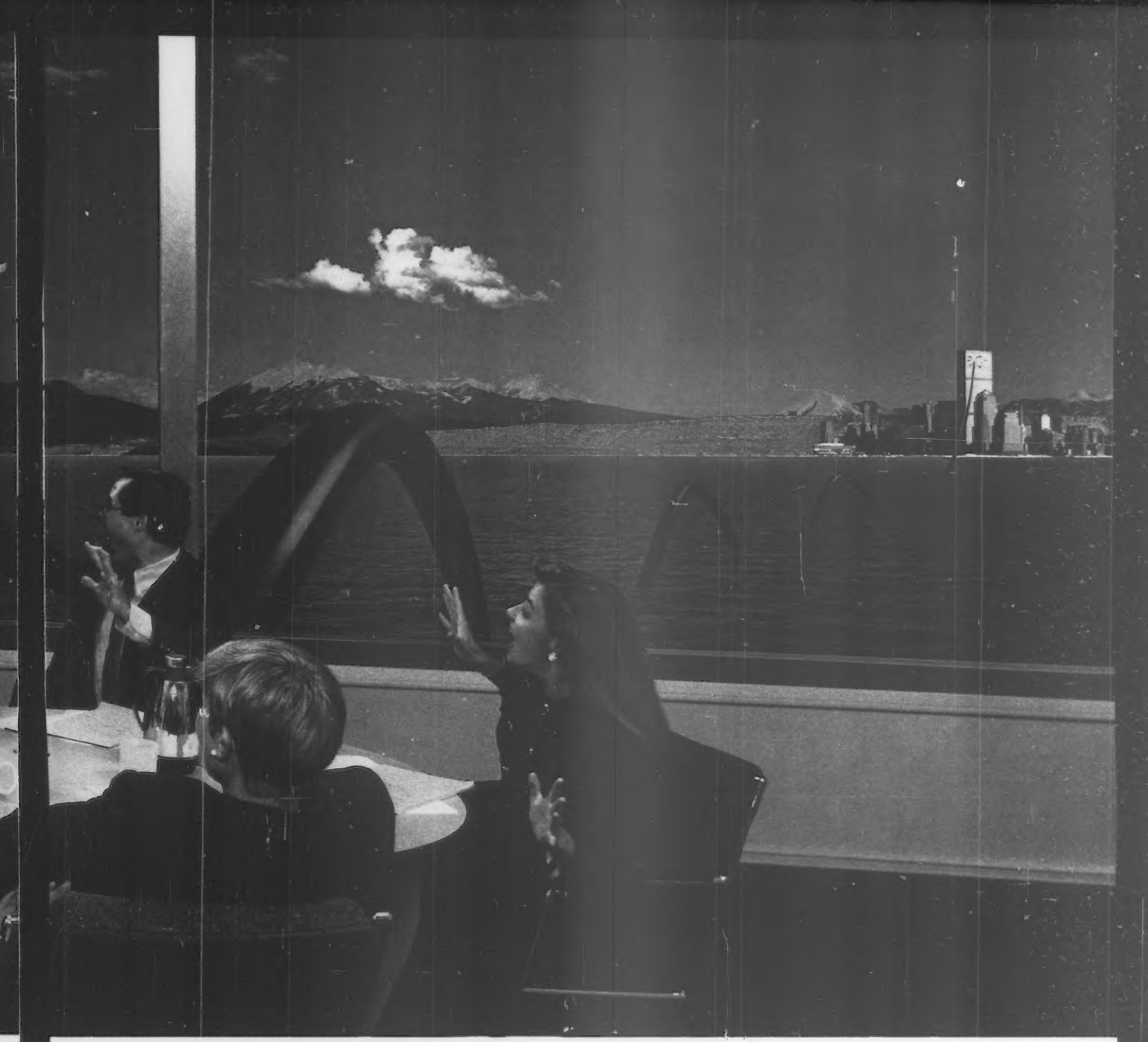

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TECH TALK

Faster car design

■ Evans & Sutherland Computer Corp. said it recently received more than $3.4 million worth of orders for its conceptual design and rendering system (CDRS) and workstations. The systems were purchased by Ford Motor Co., Volkswagen AG and Audi for automotive and product design. CDRS is a computer-aided industrial design system that enables designers to create and visualize surface models that can be transferred directly to engineering for analysis or to manufacturing for tool preparation. The system can potentially shave 26 or more weeks off the time it now takes to design new cars, Evans & Sutherland said.

Mail machines

■ The U.S. postal service has announced plans to fund a computer vision laboratory at the State University of New York in Buffalo. Researchers at the university will develop computer systems capable of deciphering handwritten addresses. The laboratory aims to have prototypes within two years of computers using artificial intelligence and neural networking technologies that will be capable of reading up to a dozen pieces of mail per second. The initial funding will be $3 million.

Flat panels rise

■ Sales of flat-panel displays will increase from $1.96 billion in 1990 to $8.7 billion in 1997, according to a new report being marketed by Information Associates, Inc. in Menlo Park, Calif. The number of units shipped will increase from 17.6 million to 47 million during the same period. LCDs, which now account for 60% of the worldwide market for flat-panel displays, will increase their dominance in the market, according to the report. Plasma displays account for 30% of the market, and vacuum fluorescent, electroluminescent and other technologies account for the remainder, the report said.

Doctors save time writing without pens

Physicians discover that using voice-recognition technology can omit paperwork

BY MICHAEL ALEXANDER
CW STAFF

The physician speaks distinctly into the telephone handset, pausing imperceptibly between words. Her words instantly appear on a computer monitor, and in less than one minute, she has completed a report on the patient who was seen by emergency room staff members.

Voice recognition has not caught on in corporate America in a big way, but the medical profession is increasingly enthused about the technology because it enables physicians to not only speedily compile reports but also to save money and help guard against malpractice suits, according to Dr. John Holbrook, director of ambulatory care at Mercy Hospital in Springfield, Mass.

Twenty-two physicians and others at Mercy Hospital are using four computers on a Novell, Inc. network that have been equipped with a voice-recognition system developed by Kurzweil Applied Intelligence, Inc. in Waltham, Mass.

Increased accuracy

Voice-recognition systems, now in their fourth generation, are much improved over earlier generations. The systems now coming to market are "speaker independent," which means they require little training. They also have larger vocabularies and are more accurate.

Emergency room physicians at Mercy Hospital see 30 to 50 patients per day and compile a report on each case. With the voice-recognition systems, physicians can create and print a standard one-page report in about two minutes.

The system also makes use of "trigger phrases," a form of verbal shorthand that enables the physician to compile a report using fewer words in less time. A single word or phrase can trigger an entire report segment that can be modified to describe the condition of individual patients.

A handwritten report, which would not be as complete, typically takes two to three times as long, Holbrook said. The alternative would be to dictate the report into a tape recorder and have it transcribed, returned for corrections and typed in its final form, a process that often takes up to five days. Transcription costs amounted to $75,000 to $100,000 per year, Holbrook said.

The system also automatically inserts codes that are required by insurers to determine reimbursement of medical expenses. "The cost of assigning billing was $50,000 to $100,000 per year," Holbrook said.

One unexpected benefit of using voice-recognition systems is that by producing more polished reports, the physicians have been able to save about $4,000 per doctor on annual malpractice premiums. "Once in every 30,000 times — twice a year in our case — a lawyer will send for a transcipt of a report," Holbrook said. "Many cases are lost where the care was good but the documentation was terrible. The reports won't stop malpractice suits, but our model is that it should cut them by approximately 45%."

Insurance companies that specialize in malpractice insurance are offering discounts of up to 40% on premiums to physicians who have completed a course in risk management. The physicians must also consistently produce case reports that fit specific guidelines. Automating report-writing procedures has facilitated meeting guidelines, Holbrook said.

More than 300 Kurzweil Voicemed systems are in use at over 200 sites nationwide, according to Bernard Bradstreet, president of Kurzweil. The systems, which are built around Hewlett-Packard Co. Vectra personal computers, range in price from $12,900 to $30,600.

Tom Monahan

Voice recognition gets faster and better

Voice-recognition technology has improved considerably in recent years. The systems now coming to market are faster, more accurate and have larger vocabularies than ever before.

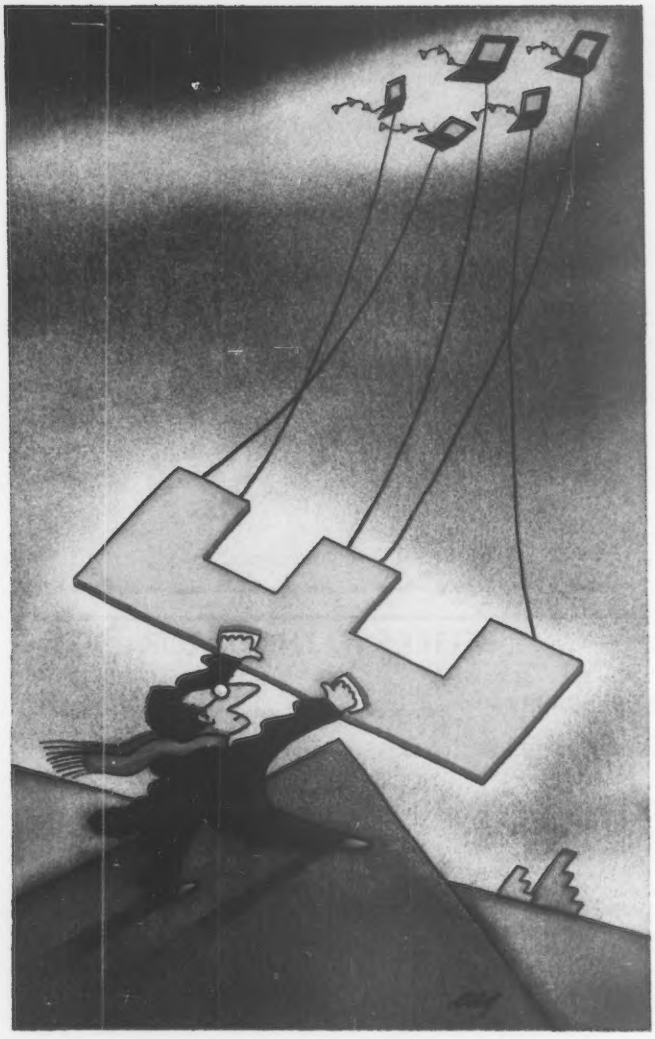
The first speech-recognition systems to debut were "speaker dependent" and had to be trained by the speaker. The user provided at least one spoken sample of each word in an application and then templates or word models were made from the samples. The technology is still being used widely, typically for applications requiring dozens instead of thousands of words. In comparison, speaker-independent systems can be used without training. With so many variations in the way people speak — ranging from regional accents to speech impediments — earlier speaker-independent systems did not have large (more than 1,000 words) vocabularies.

"Size of the vocabulary is no longer a problem," said Bernard Bradstreet, president of Kurzweil Applied Intelligence.

However, thanks to the availability of greater processing power, some large-vocabulary, speaker-independent systems now have up to 30,000-word vocabularies. Also, some systems can adapt over time to accommodate varying speech patterns of various users and have thus become more accurate. "The accuracy rate is 90% or better the first time out."

The systems also recognize speech that is either discrete, connected or continuous. Discrete speech consists of words that are spoken one at a time and punctuated by noticeable pauses. Connected speech is spoken in short strings of words that are sometimes separated by beeps. Continuous speech is normal conversational speech. Most systems recognize discrete or connected speech. "Continuous speech needs more processing power and further development," Bradstreet said.

The goal of automatic speech recognition is to have a highly accurate system that contains an unlimited vocabulary, is able to detect and correct its own errors and can process continuous speech, according to a report called "Speech Recognition: Principles and Commercial Applications," published by New Science Associates, Inc., a technology analysis firm in Southport, Conn. Achieving that goal will require blending speech recognition with other advanced technologies such as natural language processing, neural networking and knowledge representation systems, the company said.



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EDITORIAL

Lessons of war

THE VIDEOS SHOWN last week by the U.S. Department of Defense attest beyond a doubt the unreal accuracy of our high-tech weaponry in the Gulf war.

But that performance also begged a question that will continue to be heard long after the bombs stop raining on Iraq: Why are we as a nation so damn good at producing weaponry second to none in the world and at the same time unable to compete effectively in so many important commercial manufacturing markets?

The computerized electronics and circuitry in those weapons are mind-boggling. Yet in commercial electronics, our products offer only token competition to Japanese goods.

Our tanks can fly across the desert at 50 miles per hour, firing on the run. Yet our carmakers lose market share year after year and still rely on the "voluntary" quotas our foreign competitors impose on exports to the U.S. Our steel industry is a shadow of what it should be.

Hopefully, the true peace benefit in time will be effective transfers of this weapons technology to *our* struggling industries. After all, it's been paid for with U.S. tax dollars.

When the smoke of battle finally clears, a nagging reality will again come into focus: We dominate in only two areas — weaponry and computer products. Effectively deployed in the greatest ongoing struggle, the economic wars, these two can play off one another and be used as leverage for a much-needed competitive edge where it really matters to Americans — in the workplace.

Editor's note

Of all the upstarts and mavericks the computer industry has produced, it could be argued that none has had more lasting impact than DEC. For even though the firm has long since shed its rebel mantle, perhaps no other firm has been more influential in breaking the old centralized mainframe mold and paving the way for the distributed computing paradigms that dominate the corporate world today.

It is ironic that some 20 years after DEC launched its assault on the mainframe bastion, it finds itself struggling to be a bigger part of the new wave of distributed computing. This struggle finds the company smack in a state of transition across the board — from product strategies to internal management to corporate culture.

Beginning today on page 1 and continuing for three weeks, *Computerworld* takes a look at DEC in transition. Our DEC team, headed by Maryfran Johnson, conducted more than 50 interviews with customers, analysts and the very top brass at the company.

As you'll see, the problems raised by the customers in today's installment are fully acknowledged by company executives, who are readying a batch of fixes in hope of strengthening the company for the 1990s so they can say once again, "DEC has it now." You be the judge.

LETTERS TO THE EDITOR

Funny problems

Your "Forecast 1991" [CW, Dec. 24, 1990/Jan 1, 1991] issue was amusing but hardly entertaining. It was too much work correcting the inaccuracies. Why, in "Microsoft Claims the Desktop Mantle," do you insist on comparing workstation to personal computer sales one-for-one? How about measuring it in millions of instructions per second as well?

In "Faster Than a Speeding . . .," you enumerate the problems of Unix: Hard to learn? Most workstation vendors I know provide a slick graphical interface that is like the Apple Macintosh, only more powerful. Difficult to use? Unix has modular tools that fit together in generally compatible ways with gateways to other systems.

Please try to maintain accuracy and broad scope in dealing with these issues. Software engineers read your publication, too — maybe some should write for it.

P. Joseph Argenio
Health Information Technologies
Princeton, N.J.

Multitasking Mac?

When I read your quote of Patrick Lee ("You can do multitasking with Windows, and you can't with Apple.") in your article "Users' trust in Mac slip sliding away" [CW, Jan. 14], I had to wonder. As I word process this on a Mac Plus, an Excel macro is running in the background creating and updating files, two different printer spoolers serve a page and dot matrix printer simultaneously, and Hypercard waits in the wings. If multitasking is the ability to have different applications executing at the same time, then I have it and have had it for the last two years. Any arbitrary Macintosh has this ability, too, which is not the case for micros running DOS.

Certainly Windows is a major advance in system software for PCs and is deservedly popular. On the other hand, if you lived all your life with candles, you'd think an oil lamp was hot stuff if you'd never seen an electric light.

Bruce A. Dath
S. R. Comerford Constructors Corp.
Marina Del Rey, Calif.

Blind faith

As a board member of the International Users Group for Repository and AD/Cycle, I want to thank Rosemary Hamilton for covering our first annual conference. I commend her for pointing out (and questioning) the blind faith many people seem to place in IBM. [CW, Oct. 29] The founders of the user group hope we can become a force in defining repository-based application development, for we aren't all as docile as Ms. Hamilton portrayed.

Over the past few years, many of us have provided input to IBM on how we want the process of building and maintaining systems to work. Many participated in "customer councils." One of the conference speakers, Dan Tasker, a consultant from Australia, led the Guide project that developed a massive entity/relationship model of a repository. Another speaker, Ed Peters of Manufacturers Hanover Trust, chaired the worldwide IBM Users Group Application Development Joint Project (ADJP), in which representatives from Guide/Share organizations from around the world, including myself, developed an "Application Development Strategy" paper, which was specifically mentioned in the Sept. 19, 1989 AD/Cycle announcement.

IBM and the ADJP built on the work of the user groups in the '80s such as "Guide/Share Language Futures Task Force," "Integration of Development Tools Strategy," "Repository Data Model Strategy" and on work done inside IBM.

So this is not "a trip back in time." We IBM customers asked for AD/Cycle. We welcome it as IBM's recognition of the vision many of us have of a model-driven repository-based application development environment.

We also can't complain if the solution delivered so far is not complete. The ADJP told IBM, point blank, "Don't wait until it is perfected! Get pieces out to us so we can learn and get ready."

Many people may "simply follow IBM's lead," but many of us have a strategy and are deeply involved with IBM and other vendors to make our vision happen.

Richard Stromberg
Information Systems Dept.
Du Pont Co.
Wilmington, Del.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

Fighting terminal terrorism

WINN SCHWARTAU

The word terrorism elicits vivid front-page images — murder, kidnapping, hijacking and suicide missions. However, now that the planet is connected by an ad hoc global network, a more effective terrorist assault would be one that attacks the inherent vulnerabilities of the world's information processing systems. To the discredit of those who created the information infrastructure and of national governments, which have been largely inactive, there are no defensive mechanisms in place to thwart such an attack.

It is almost inconceivable that society could function as we know it without the data processing systems upon which we rely. Information, whether in the form of raw data or well-correlated intelligence, is the key building block on which modern society rests.

It is also implicitly evident that maintaining the sanctity and privacy of data is crucial to the continuation of a well-ordered society.

For an attack on an information processing-intensive society to be truly crippling, it would require assaults on multiple fronts. This should not be taken as a comforting thought, however. Such a well-coordinated and well-financed attack is now a distinct possibility, and we have many points of vulnerabilty.

There are methods and techniques that have been shown to be quite capable of inflicting massive damage on the world's information systems with a relatively minor investment of time, manpower and resources. Such an attack can also be launched by remote control, with little or no ability to identify and retaliate against the perpetrators. It may be weeks, months or years before an attack is detected, and then, if properly effected, the source of the attack is completely disguised, rendering a response impotent.

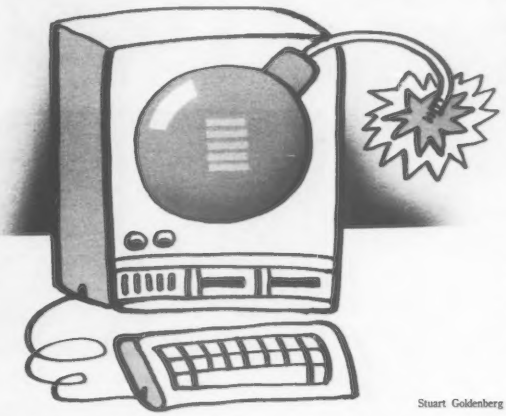
Using Trojan horses, bombs, crystal viruses, macro viruses, worms, data viruses and a host of other well-documented influenza-like computer diseases, a computer terrorist would hope to widely proliferate hundreds or more diseases in an incubation mode, perhaps for months or even years, before the first symptoms became manifest.

Another often-overlooked mechanism for compromising systems is aerial assault. We often forget that communications systems use cellular technology and satellite transmissions. Local-area networks are using radio frequencies in increasing numbers and phone lines transmitting data are up-down linked, as are wide-area networks.

Radio frequency interception is a nearly trivial task today. Using an "intercept/transmit" model, viruses can be injected into communications systems with relative ease. The U.S. government has issued contracts for studies on methods of infecting enemy military computers with viruses in hopes of shutting down battlefield computing and communications capabilities.

Furthermore, it has been conclusively demonstrated that computer video terminals (personal computer, minicomputer or otherwise) emanate a distinct electromagnetic radiation pattern that is detectable and permits recreation of the data.

Covert detection of pixel radiation is not a complex affair and is well within the financial reaches of the amateur hobbyist using even the most primitive equipment. The copious use of coherent monitor radiation detection equipment would be an integral part of any coordinated attacks against an information processing society.



Stuart Goldenberg

The manpower resources and the technical and mercenary skills needed to launch such attacks are known to be widely available. So are the means to protect the world's information base, but those whose task it is to protect have been lax, even derelict, in the execution of their fiduciary, legal and moral responsibilities.

Most major computing centers, especially in the U.S., have wide-open doors that invite invaders. The state of computer security and access control is dismal. It is no wonder we hear daily of computers being compromised and/or damaged by outsiders or of banks being held hostage by hackers.

It is indeed incumbent upon the data processing manufacturers, with the appropriate demand and concern from their customers, to build protection mechanisms into their systems that will largely render such attacks impotent. Manufacturers are providing industry with massive computing power, and the power of the systems increases daily. So far, however, they have ignored the value of the contents of the systems they sell.

Unless industry and its customers implement superior defense mechanisms, they will find themselves potentially on the defensive side of a devastating attack against which there is no winnable defense. In other words, they and we will all lose.

For a motivated individual or organization, an assault on our information processing capabilities would be an effective attack on a global Achilles Heel, an electronic Pearl Harbor.

Let's see if we can change that before it's too late.

Schwartau is the author of *Terminal Compromise* and executive director of the International Partnership Against Computer Terrorism.

Dating problems now? Wait 'til the year 2000

RANDALL L. HITCHENS

The turn of the century will not be business as usual for many businesses. The year 2000 will be the first century change ever endured by an automated society, and if your organization uses computers, that means you are sitting on a time bomb.

Defusing the bomb may be easy and inexpensive for some companies, but for many others, it could be a human and financial disaster.

The problem is that dates are stored with only two-digit years (omitting the century digits). As an example of the problem, suppose you hire someone on 11-26-98 and are tracking five-year vesting rights on some benefit. The logic is to subtract one date from another and look for five or more years difference. So 99 minus 98 is one year. But what about 11-26-00? What's 00 minus 98?

Standard-setting bodies now recognize the problem. In 1988, for example, the Federal Information Processing Standard Publication 4-1 adopted the American National Standards Institute's X3.30 standard, specifying that four-digit years be used. The fact, however, is that such rulings have little impact on many of today's production computer systems, which were written anywhere from 10 to 30 years ago.

Difficult to comply

In practice, maintenance programmers have little opportunity to keep up with standards publications. Most of their time and effort is focused on reducing storage requirements, improving performance or meeting other unique requirements of the system at hand. Not incidentally, the same activities that distract programmers also help to produce a hodgepodge of custom date formats and algorithms, which would make compliance more difficult even if standards were known.

Many people who hear about this problem for the first time dismiss it as trivial or nonexistent.

In part, this attitude seems to stem from an unwillingess to borrow trouble from the future. Several key information systems managers have told me that because they're not going to be in their job in nine years, they're not worrying about it. Others complain that they are so busy keeping their heads above water today, they don't have time to worry about nine years from now.

The major reason many people consider the century change a nonissue, however, is that the solution seems simple from a technical viewpoint. There are, as many people are quick to point out, relatively simple ways to adjust programming to accomodate the turn of the century. The crux of the problem, however, is not technical difficulty but the number of places in which such changes will need to be made and the number of steps involved in the process.

Practically every data-entry screen uses some sort of date arithmetic to validate entries. Most systems have date comparisons and computations of some sort. Worse, though, are systems that use identifiers with dates embedded in them. For example, one corporation tags stock trades with sequential numbers containing the date of the trade. That tag is used to identify dozens of aspects of the trade through many systems made up of thousands of programs.

No easy way out

Most older and larger systems will, at a minimum, have to be reconstructed. Even setting aside larger questions, such as how changes to something like a tag number will affect day-to-day operations, reconstruction efforts can entail massive effort.

First comes the sizable job of simply identifying where changes need to be made. You have to inventory all lines of code referencing dates either as fields in files or as computations and decide which ones need adjusting. This task is complicated by the often bizarre way dates are stored and operated on, the inconsistent and frequently illogical names given to such fields and the analyst's probable lack of familiarity with all the purposes and uses of each field.

Having made an inventory of required changes, you must mesh the list with the 10-year plans for programming development and then determine how to handle each instance. The appropriate choices range from doing nothing at all (when dates are used for display purposes only and people know what year 00 means) to completely reorganizing files and programs and writing utilities to migrate them to the newer version.

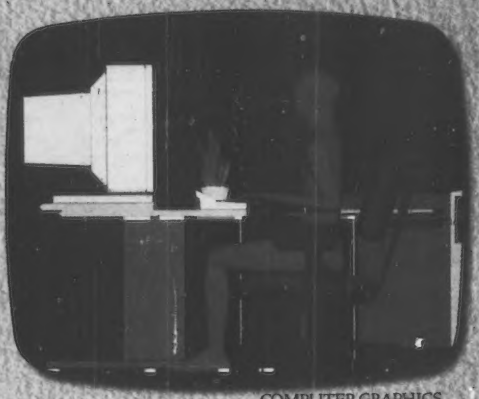
Of course, no changes should be implemented without testing them. And for large, complex systems that interact with other systems, the testing will be a very large project itself.

What we have here is a massive IS problem that is very much like a computer virus designed to work on a specific date. The good news is that we have two advantages over a virus. First, we know about the existence of the problem. Second, we know we have a certain number of millions of lines of low-level code to comb through to locate required changes. The bad news is that given the amount of territory to be covered, nine years is a rather short time.

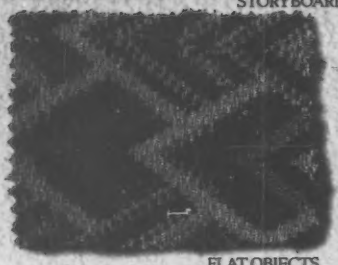
Hitchens is a managing partner at the management consulting firm of Sundance Software, Inc. in Armonk, N.Y.

STORYBOARDS

COLOR TRANSPARENCIES



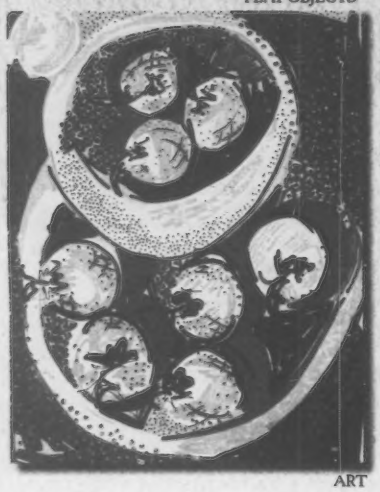
COMPUTER GRAPHICS



FLAT OBJECTS

CAD/CAM/CAE SYSTEMS

PRINTED MATERIAL



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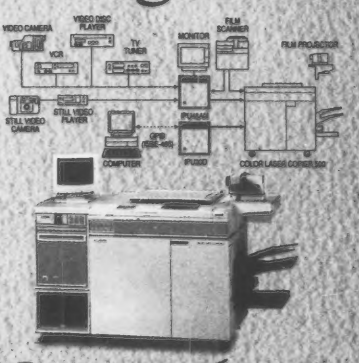

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Users taking a slow approach to Escon technology

ANALYSIS

BY ROSEMARY HAMILTON
CW STAFF

Several information systems managers recently contacted said that while they are looking forward to Escon, IBM's new channel architecture, they are in no rush to implement it.

That is good news, since most of the real Escon power is not available. The start date for the true Escon benefits — very high data transfer rates and great distances between processors and peripherals — will not really begin until later this year.

Dan Cefola, an Escon planning manager at IBM, said users can begin implementing Escon today, but it will have only limited capabilities.

However, that suits some users just fine, because they want to take a cautious approach to the new architecture.

Doug Underhill, an assistant vice president at CSX Technology, a subsidiary of CSX Corp., said he expects to implement Escon in phases, perhaps beginning later this year. He said the company will decide on specific Escon plans "within the next 90 days."

"We had a look, and we are reasonably impressed," added William Simpson, manager of computer facilities at Kemper National Insurance Cos. in Long Grove, Ill. "We don't have any present need. I don't suspect we will until mid-1992 at the earliest."

According to Technology Investment Strategies, Inc., a market research firm in Framingham, Mass., it would make sense for most users to wait until equipment with native Escon support is available, unless they have serious space or performance issues.

The company is recommending that in most cases, users should move to Escon as they purchase new, Escon-ready equipment instead of retrofitting existing hardware.

A big year expected

Frank Gens, a vice president at Technology Investment Strategies, said he expects the first wave of Escon migration to take place in late 1991. Furthermore, he said, many large shops with space problems have already implemented fiber extenders from IBM, which existed before Escon and bring some relief.

Escon is the first major architectural change in two decades for communication between processors and peripherals. With today's technology, the average data transfer rate is 4.5M byte/sec., and a peripheral can be no more than 400 feet from the processor.

Escon is intended to greatly improve that transfer rate as well as the distance limitations. As it was initially set up by IBM, Escon will deliver data transfer rates of up to 10M byte/sec. Second, it will allow users to place peripherals, including direct-access storage devices (DASD) and tape controllers, several miles away from the host.

Analysts said they expect those features to be expanded in the future. Technology Investment Strategies predicted IBM will increase the data transfer rate to 18M byte/sec. within the next 12 to 18 months.

Full Escon *availabililty will highlight advantages over copper wire*

For now, however, users will be limited by the Escon availability.

Fiber cable, two versions of the Escon Director and Enterprise System/9000 and 3090J models built to accommodate this new architecture are available today. This gives users the option of installing fiber that can directly connect to an Escon-ready processor.

Also, users can set up their Escon hub, which is essentially the service performed by the Escon Director.

Two versions are available, with prices of either $45,000 or $135,000 for the higher end model that supports up to 60 ports.

Limitations hit when a user moves beyond this point. The fiber cable can attach to various peripheral controllers, but these existing devices do not recognize the Escon protocols. The Escon-ready peripherals will not be available until later this year or next year.

Nonetheless, a user could go ahead with the non-Escon peripherals by using one of two Escon converters, which would essentially shift the system back to the older technology so that data would move across fiber lines at the older transfer rate.

In other words, virtually no performance improvement would be achieved.

A latecomer

Furthermore, one of the converters, designed specifically for DASD units working with non-Escon processors, will not be available until the second quarter of 1992. The other converter, available now, can be used with any peripheral and an Escon-ready processor.

Cefola said using Escon converters is intended for those with substantial space problems in the data center. In addition, it would allow any users to begin their move to the new architecture and get familiar with it.

However, gaining that familiarity could be costly. Bob Callery, an analyst at Technology Investment Strategies, suggested that using converters is an expensive, temporary fix that will not be needed once the devices with native Escon support become available. Each converter sells for $15,000.

One IS manager seemed to agree. David Moore, a senior vice president at Mellon Bank Corp., said he opted not to retrofit existing 3090 channels at his company.

"In my case, it's probably not a good investment," Moore said. "I made a decision to wait until I installed new processors."

Mips, assured of ECL supply, introduces enhanced server

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Declaring that the problems it had with a reliable supply of emitter-coupled logic (ECL)-based processors for the last six months is over, Mips Computer Systems, Inc. recently expanded its line with a second server based on that technology.

Robert Miller, Mips' chief executive officer, acknowledged processor supply problems for its original server, the RC6280, introduced last November. However, he said that Bipolar Integrated Technology, Inc., Mips' CPU manufacturer in Beaverton, Ore., "has substantially improved production, and there is going to be a second source for the processors from NEC Technologies, Inc."

The original ECL-based server performs at 95 Dhrystone millions of instructions per second (MIPS), and prices started at $150,000. The new computer, the RC6260, runs at 68 Dhrystone MIPS, with prices beginning at $140,000.

Analysts such as Omri Serlin in Los Altos, Calif., said ECL technology is difficult to make reliable because of cooling problems — although it does allow for faster CPUs. "I tend to doubt ECL will go anywhere. CMOS technology is catching up in speed."

Temporary help

This new server, as well as one based on Mips' regular CMOS processor also introduced last week — the RC3360, running at 32.8 Dhrystone MIPS for $65,500 — are interim machines while the firm tries to get out its next processor.

That CPU was expected by analysts in mid-1990, and its tardiness has taken away some of the firm's early momentum.

John Dean, an analyst at Salomon Brothers, Inc. in San Francisco, said he now expects the CPU to be announced early next month but added that it will not ship until the end of the year.

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*Gartner Group's *Software Management Strategies*, P-480-866, "LEGENT's ASO Products Take the Lead," 8/29/90.

LEGENT

A World Vision that's wide open

ON SITE

BY CAROL HILDEBRAND
CW STAFF

To get potential donors to open their wallets, World Vision first had to open its systems.

The nonprofit relief and development agency is migrating from a mixed proprietary IBM/Sperry Corp. environment to one running Unisys Corp.'s Unisys System 5 Unix system and Informix Corp.'s Online relational database engine. The agency, which raised roughly $200 million in 1990, derives a large portion of its funds from individual sponsorship of needy children.

World Vision is betting that corporatewide access to donor and project information will not only funnel more money directly into relief but also help the agency target fund-raising activities more effectively.

According to Bob Willcox, system conversion planner at the Monrovia, Calif.-based group, the process of migrating from its Sperry platform about two years ago triggered the realization that its information systems structure and its company goals were at loggerheads.

"More than anything else, we're a purely informational organization," Willcox said. "We don't have a product per se. We're selling information on how people can help others. So it became very important to be efficient at how we were getting, using and sharing information."

The old environment, which was very centralized, did not lend itself to the idea of information sharing, Willcox said.

Even if World Vision had chosen one of its two environments and upgraded on it, it would still be facing a conversion, which is an expensive proposition, he said.

"We saw an opportunity through open systems to hopefully do this one last time and not have to face this [conversion] again. We basically threw out all the old models and said, 'OK, if we had to start over again, how do we want to do business?' "

The way the agency wanted to do business is on three Unisys 6000/70s and one 6000/80. Still in the middle of the conversion process, World Vision has targeted several functions as key.

Its most critical application, which involves donor enrollment and matching needy children with potential sponsors, has been up and running on the new system since mid-October 1990. Radio, print and television requests for pledges run a toll-free telephone number, and donor responses are then stored and tracked on the database.

Willcox said the agency chose a telemarketing package from Brock Control Systems and telescoped the conversion process to 3½ months, down from an estimated nine.

Willcox said the excitement generated by the new application among the 60-odd users was critical to the success of the conversion. "End users can destroy any process they want if they don't get excited," he said. He added that the IS staff made a real effort to sit down with users to make sure they were comfortable with the screen modifications.

World Vision, *a nonprofit relief and development agency, hopes to improve efficiency with a new relational database system*

World Vision is also trying to manage its money more effectively through use of the common database. Willcox said the ability to analyze the success rate of a given campaign as it is being conducted will allow World Vision to do a much better job at managing revenue.

Analysis of donors and giving patterns is another of the critical applications currently targeted for conversion. Presently done by batch processing, Willcox said he is aiming for on-line analytical capabilities. So, for example, the system will be able to "tell me about all the donors in certain ZIP codes who have given more than $20 for clean water projects in Africa in the last six months," and have the information in real time.

The agency, which sponsors 5,500 projects in 89 countries worldwide, will eventually convert more than 400,000 lines of code, but the end result is worth it, Willcox said. He is hoping to have the ability to do an immediate match when a potential sponsor places a call to the agency, a process that now takes a matter of days.

"We recognize that the sooner we can make the ID between a donor and a child, the more committed that person will be to that child."

Must Software enhances VAX, PC Nomad packages

BY JOHANNA AMBROSIO
CW STAFF

Must Software International's latest versions of Nomad, which were introduced recently, sport enhanced communications with other vendors' database management systems.

Version 3.0 of Nomad for Digital Equipment Corp.'s VAX/VMS computers includes interfaces and servers to DEC's RDB relational DBMS. The interfaces and servers work with DEC's personal computer integration software, Pathworks, to provide record-level access to RDB from terminals and MS-DOS-based workstations. A version of Nomad for OS/2 is also available.

The new version of Nomad for the VAX is better integrated with the VAX environment, Must said. For example, users can now install Nomad with a standard DEC installation facility. It also has a new application development tool kit.

Nomad for VAX is available now and sells for $3,000 and up, depending on the hardware configuration. RDB servers and interfaces are included at no charge or can be purchased separately for users of older Nomad versions. Prices range from $900 to $50,200.

PC Nomad Version 3.0, also has a new interface to RDB and to Gupta Technologies, Inc.'s Sqlbase server. The PC version includes a new applications development tool kit supporting IBM's Common User Access.

The new OS/2 package is identical to Version 3.0 of the PC software, Must said. The OS/2 and MS-DOS versions are available now for $995 each.

Early users of the new versions gave it high marks. "I'm really impressed. The speed is up there, and the tools are really solid," said Don Astley, senior programmer/analyst at Lee County's MIS group in Fort Meyers, Fla. He is using the new versions of Nomad VAX and PC VAX to help downsize a mainframe-based Nomad application.

The county is rewriting its criminal justice information system — which tracks courts, judges, witnesses and other information — to "take advantage of the VAX's networking capabilities," Astley said.

Astley said Nomad is helping the conversion effort because the VAX and PC packages are "similar enough to the IBM version so it doesn't slow you down."

He mentioned one glitch, however. "We made a mistake because we used Nomad behaviors when we were coding," Astley said. "When we had to go against an RDB engine — oops. There were some differences we had to correct, and now we're aware of them."

Mary Kilbourn, data management supervisor at the University of Texas M.D. Anderson Cancer Center, also uses Nomad's new RDB interface. "Our data is stored in RDB, and this now allows multiuser applications and simultaneous updates," she said. The center is using Nomad VAX 3.0 to track patient trials with experimental and other types of treatments.

Interlisp support shifts once again

BY JEAN S. BOZMAN
CW STAFF

SAN CARLOS, Calif. — Since 1981, a hardy group of approximately 1,200 users has weathered three shifts in software support — first getting support from Xerox Corp., then from a Xerox spin-off and now from a start-up support firm. And it has all been done for their love of Interlisp.

Interlisp, a 10-year-old interactive version of the LISP programming language, allows users to debug and program new code interactively, without compiling. The tool can be somewhat habit-forming, its users reported. "It's truly painful to learn LISP at first," said Craig Givens, a systems developer at government contractor Systems Control Technology in Palo Alto, Calif. "But with Interlisp, you get the feeling of writing something and watching the results happen on-screen."

The users are scattered at 200 sites worldwide. Interlisp was developed at Xerox's Palo Alto Research Center in the late 1970s. Today, its users communicate by electronic mail over the Usenet network for Unix users and meet once a year at the American Association for Artificial Intelligence conference.

A changing of the guard

However, the Interlisp world was shaken by Xerox's discovery in the late 1980s that its AI business was unprofitable. "We found that AI could no longer be in our mainstream product line," a Xerox spokeswoman said. And so, in 1988, Xerox formed a spin-off firm to support the user base.

After nine months of operation, the spin-off, Envos, Inc. in Mountain View, Calif., closed its doors, and support nearly came to a halt. "We had to choose between bringing the product to the end of its life and creating a support alternative," said Joe McGrath , vice president of Xerox's Integrated Systems Operations in Sunnyvale, Calif. The option taken was to contract with start-up, Venue, Inc., staffed by former Xerox employees.

Interlisp users seem pleased the situation has again stabilized. "If Venue happens to disappear, we would be in a pretty difficult situation," said Takamichi Ariga, a systems developer at the University of Toronto's Dictionary of Old English project. "We have invested a fair amount of time and money in the system over the last seven years."

The University of Toronto project uses six Xerox workstations and several Sun Microsystems, Inc. Sun-4 workstations to catalog Old English, as spoken in medieval times. A homegrown database, programmed in Interlisp, stores most of the surviving Old English texts in the world, Ariga said.

The university used to pay nothing for Xerox support because of a special grant arrangement for universities, but it now pays several hundred dollars per month to Venue.

Venue's latest Interlisp release, Medley, also supports Common LISP, the industry-standard LISP language used by Symbolics, Inc. and Texas Instruments, Inc., according to Arun Welch, a computer scientist at Ohio State University. Xerox managers said they hope the Interlisp support problem has been solved. Venue President John Sybalsky has been calling users on Xerox's mailing lists and offering support contracts.

Helping hospitals share information

System collects data, makes it available for access by member institutions

BY ELLIS BOOKER
CW STAFF

IRVING, Texas — The challenge of controlling information at a single hospital pales in comparison to the job of sharing information about clinical performance and operating costs among medical institutions.

At the Voluntary Hospitals of America, Inc., a national healthcare alliance, the ability to exchange this information among its hundreds of member hospitals was deemed vital to keeping costs down and better identifying effective ways to care for patients.

Earlier this month, the company announced that it had begun deploying a software system called the Clinical/Financial Information System to its 650 not-for-profit hospitals and their more than 185 affiliates.

Merged databases

Chicago-based systems integrator Andersen Consulting developed the centralized relational database package, which takes data from a hospital's existing clinical and financial systems and processes it into a common clinical/financial database.

Voluntary Hospitals of America holds the rights to the software and has no plans to market it to others, company officials said.

To date, approximately 85 Voluntary Hospitals of America institutions have installed or are installing the software; another 105 hospitals have signed five-year contracts for the software and data processing service.

According to Bradley Petersen, Voluntary Hospitals of America's vice president of Managed Information, work on the software began in 1986, when hospitals in Minnesota, North Dakota and South Dakota began looking for ways to share information and ideas.

"Most hospitals do not have clinical and financial [data] in one place," said Petersen, who noted that the system will use custom interfaces to extract information from each hospital's existing information system.

Data from patient accounting, medical records and general ledgers will be reformatted into a common database by Andersen Consulting at its Minneapolis data center.

The common databases will then be loaded onto an IBM 3090 mainframe at the University of Michigan, where they will be available for on-line queries by planning personnel at the individual Voluntary Hospitals of America institutions, which will tap into the database over public packet networks.

The hospitals will use a relational database developed at the University of Michigan for querying the central database.

Each quarter, a comparative database will be created using the International Classification of Clinical Services, a proprietary coding system from Healthcare Knowledge Resources in Ann Arbor, Mich.

"The biggest value is that our hospitals can not only share data but also their collective wisdom and knowledge," Petersen said.

Eventually, Petersen added, Voluntary Hospitals of America hopes to use the comparative database to examine the efficacy of different medical approaches.

The cost to each hospital for the information system is a one-time installation charge of $94,000, plus ongoing fees of $30,000 to $35,000 annually.

The 10-year, $50 million contract with Voluntary Hospitals of America is the largest won by Andersen Consulting's healthcare practice. In addition to installing and operating the system, Andersen will also train hospital personnel how to use the database.

Separately, Healthcare Knowledge Resources signed a 10-year contract with Voluntary Hospitals of America to administer the on-line query system.

Work-flow system market grows

BY ELLIS BOOKER
CW STAFF

Digitizing paper documents and putting them on local-area networks makes sense only if those images appear on the computer screens of the people who need to see them.

Work-flow systems — software environments that enable companies to script the routing of images, documents, spreadsheet results or digitized video and voice to workers — will be needed to keep the paper jungle from becoming an "electronic" jungle, experts said.

In 1992, there will be a lot of work-flow architectures and products, said Scott McCready, principal at Avante Technology, Inc. and director of Image Management Technology at IDC/Avante Technology, which sponsored a conference on imaging in Phoenix earlier this month.

McCready estimated that the total work-flow market was $42.1 million in 1990, with $40 million of that being image-related. By 1993, he predicted, the market will total $583.3 million, with $350 million coming from imaging. McCready goes so far as to suggest that work-flow software will cause a renaissance in office automation.

Apparently agreeing with this assessment, Filenet Corp. — the firm that claims to have pioneered the work-flow concept in 1984 with Workflo, a scripting language for image document management — announced a general-purpose work-flow product based on Microsoft Corp.'s Windows 3.0 environment at the conference. Although personal computer-based Windows is the client platform, users will not have a choice for the server, which continues to be based on Filenet's Unix system.

Filenet's Workflo Business System consists of an application development environment called Workshop and an end-user-oriented application called Workforce Desktop. Filenet officials said Windows 3.0, with its Dynamic Data Exchange feature that allows automatic transfers of data across applications, finally brings the functionality of Unix to DOS environments.

Hopes to leverage

While not the first to have a work-flow product using Windows 3.0 — for example, Laserdata, Inc. has been shipping a Windows 3.0 work-flow developer's kit since November —Filenet hopes to leverage its Workflo Business System against general-purpose office automation tools such as AT&T's Rhapsody and NCR Corp.'s Cooperation.

"That's the future of this company," said Robert L. Castle, vice president of marketing. Castle said the Costa Mesa, Calif., company is focusing on customers who demand image capture and image manipulation, for which the usefulness of work-flow systems has been most clearly demonstrated.

Filenet claimed that about three quarters of its 400 production installations worldwide currently use Workflo language.

Workforce Desktop beta-test customer Burroughs Wellcome Co., a pharmaceutical firm in Research Triangle Park, N.C., reported a substantial increase in productivity under the system, which automates the routing of the 2,500 pages of clinical reports it receives daily from doctors participating in drug trials.

"The faster we analyze those results and get them to the [Federal Drug Administration], the faster we can get a drug approved," said John Cavallito, assistant department head of clinical data processing.

The savings include speed — the ability to call up a document in 18 seconds instead of waiting one day — and a reduction in the 6 million photocopies the company makes each year. Also, the system's ability to provide an automated audit trail for documents "is a tremendous savings for us," Cavallito said.

NEW PRODUCTS — SOFTWARE

Utilities

Help/Systems, Inc. has added an additional component to its Robot Operations Automation package designed for the IBM Application System/400 environment.

The Robotsave AS/400 disaster protection and recovery system comprises five modules: automatic backup and recovery, tape management, disaster recovery planning, object archive and data set management. The product automates disk drive backup, system restoration and tape management tasks.

The product is priced at $6,950 for AS/400 Models B/C10 to B50 and costs $9,950 for AS/400 Models B60 to B70.

Help/Systems
210 Baker Technology Plaza
6101 Baker Road
Minnetonka, Minn. 55345
(612) 933-0609

Cybra Corp. has announced Markmagic Version 1.2, an on-line bar-code software package that supports Monarch Marking Systems Thermal/Thermal Transfer Printer Models 9401 and 9402 as well as Models 9425, 9445, 9465 and 9474.

Features include one-step label file creation, point-and-shoot database field selection, preloaded graphics, box fields and format rotation.

Prices range from $2,395 to $4,595, depending on CPU size.

Cybra
One Riverdale Ave.
Riverdale, N.Y. 10463
(212) 601-7100

Britz Publishing, Inc. has announced a software package designed to enable users of IBM Application System/400s or System/38s to save and restore entire output queues.

SOQ (Save Output Queue) Release 3.0 allows multiple SOQ operations to be performed on a single disk and provides an option for checking spool entry attributes. The product is priced at $199.

Britz Publishing
P.O. Box 1156
Madison, Miss. 39130
(601) 853-1394

Kisco Information Systems, Inc. has announced a source file compression program designed for all models of the IBM Application System/400.

Squash enables AS/400 users to store source programs in a compressed format to create more disk space for other uses. The program features compression and decompression procedures and allows individual members, generic members or an entire source file to be processed.

A onetime license fee costs $500.

Kisco Information Systems
120 Beverly Road
Mount Kisco, N.Y. 10549
(914) 241-7233

NEW PRODUCTS — HARDWARE

I/O devices

Tektronix, Inc. has introduced its Phaser II series of modularly configured thermal wax transfer color printers designed for heterogeneous office environments.

Midrange models include the Phaser II DX, designed to connect to workstations; the Phaser II PXN and Phaser II DXN, which feature Ethernet connectivity; and the Phaser II PXS, which features IBM host connectivity. All four models feature 300 dot/in. resolution.

Pricing ranges from $8,995 to $11,995, depending on type of model.

Tektronix
26600 S.W. Pkwy.
Wilsonville, Ore. 97070
(503) 685-3585

RGB Technology Dba/RGB Spectrum has announced a video windowing system equipped with a television tuner for workstations.

The RGB/View 2050 ($9,495) was designed to accept video from cameras, tape recorders, interactive video discs and video-teleconferencing systems. It can also accept live TV signals from its built-in TV tuner, the company said.

The product supports workstations equipped with up to 1,280- by 1,024-pixel resolution monitors.

RGB Spectrum
2550 Ninth St.
Berkeley, Calif. 94710
(415) 848-0180

Power supplies

Elgar Corp. has introduced an uninterruptible power supply designed to control networkwide power parameters from a single terminal.

The IPS/AI 600 and 800 series include an English-language inquiry system equipped with artificial intelligence. The system's 2K-byte, 16-bit microprocessor allows local and remote system settings, collection and analysis of power data and two-way 9.6K bit/sec. communications via an RS-232 port.

Pricing for the IPS/AI 600 and 800 is $699 and $899, respectively.

Elgar
9250 Brown Deer Road
San Diego, Calif. 92121
(619) 450-0085

digital update

NEWS AND VIEWS JANUARY 1991

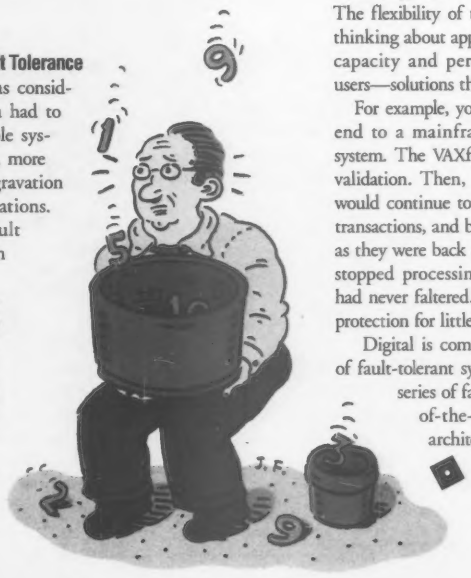
Downtime *Is Trouble*

Digital's fault-tolerant systems relieve the costly disruption of downtime—without the difficulty of installing incompatible systems.

Downtime impacts efficiency and productivity. People grow to depend on computing, on computing tools, and they are rightly indignant when they have them snatched away, often at crucial moments.

Your engineering or statistics group gets upset when terminals or workstations are out of action in a client/server environment. And when the system goes down, everyone loses everything—from electronic mail to spreadsheets, from word processing to calendar management. Senior managers lose an expensive econometric model just when they need it. An executive vice president loses crucial figures for a financial analysts' meeting.

These scenarios can be avoided. You *can* ensure your investment in office productivity—by protecting it with fault tolerance.



VAXft Series: Extending the Boundaries of Fault Tolerance

At one time, fault tolerance was considered a major undertaking. You had to install yet another incompatible system—that meant more expense, more training, and the ongoing aggravation of maintaining unique applications. No wonder you went into fault tolerance only if your application made it absolutely imperative.

But today things are different. Digital's VAXft 3000 Model 310 offers fault tolerance to relieve you of the costly disruption of downtime—without the difficulty of installing an incompatible system.

The VAXft 3000 is more than the price/performance leader for traditional mid-range fault-tolerant applications. It is a full member of the VAX system family, so it extends the benefits of fault tolerance into entirely new fields. It will run whatever applications you have on a VAX system today, and it will do this with no single point of hardware failure to interrupt the application—even if the power gets cut off. You won't have to learn new skills, write new code, or install a new power supply.

Easy Installation, Easy Operation

Installing the VAXft 3000 is as easy as installing systems of lower availability, without the bother and expense of traditional fault-tolerant implementations. Here's why:

- The VAXft 3000 is the only fault-tolerant system to run an international standard operating system—VMS. This means you can run any of more than 6,000 available applications with the assurance of knowing that they will never go down because of hardware failure. And because the VAXft 3000 runs on VMS, you don't need to retrain your staff to use a unique operating system.
- The VAXft 3000 is the only fault-tolerant system that is engineered to continue application service—even while maintenance takes place. This is because it is the only one on which every component is duplicated, including the backplanes and power cords.
- The VAXft 3000 provides transparent failover in milliseconds, and maintains the same performance level. If a hardware failure occurs, your users won't even know it's happened; they will see no difference in the quality or speed of their service. The application will continue running on the still-functioning system elements through automatic hardware reconfiguration.

Flexibility, Too

The flexibility of the VAXft Series opens up a whole new way of thinking about applications. Instead of just considering the need for capacity and performance, you can tailor solutions for your users—solutions that have the right level of availability.

For example, you could install a VAXft 3000 system as a front-end to a mainframe running a major transaction processing system. The VAXft 3000 could handle data acquisition and local validation. Then, even if the mainframe went down, your users would continue to be serviced by the VAXft 3000. It would store transactions, and bring the mainframe databases up to date as soon as they were back on line. Only you would know if the mainframe stopped processing. To your users, it would seem as if service had never faltered. And you can provide this level of fault-tolerant protection for little more than the cost of a conventional solution.

Digital is committed to expanding the performance spectrum of fault-tolerant systems. In fact, the VAXft 3000 is the first in a series of fault-tolerant systems. Future systems will be state-of-the-art and completely compatible with the VAX architecture—making downtime a thing of the past.

DSSI: Big System I/O Power for Smaller VAX Systems

You know how important I/O power is for such key applications as transaction processing and decision support. But for years, strong I/O power was available only if you bought large, expensive systems, which were not suitable for open-office computing. Now, the Digital Storage Systems Interconnect (DSSI) changes all of that.

DSSI is the second-generation implementation of the Digital Storage Architecture (DSA) family of storage products. This low-cost, high-performance subsystem connects disk and tape Intelligent Storage Elements (ISEs) to mid-range VAX and MicroVAX systems, in single-host or dual-host packages ideally suited for open-office computing.

With DSSI, you can build full-featured, dual-host VAXcluster systems, sharing disk and tape resources. And you can achieve exceptional levels of data availability and performance at very competitive prices.

Your Data: Available

The functionality built into the Digital Storage Architecture, and into all Digital software, enables DSSI to deliver all of the data you need, when you need it. Dual-host VAXcluster systems are particularly well-suited to client/server and production computing. Such clustered systems have automatic failover capability; if one of your systems fails, you still have access to your data. In addition, VMS Host-Based Volume Shadowing and Digital's predictive maintenance facility, VAXsimPLUS, provide protection against the loss of a disk.

Your I/O Power: Strong

DSSI is a low-latency bus that multiplexes command and data packets at very high speed. Performance does not degrade when you add storage devices. Double your number of disks, and you double your I/O request-handling capability.

Integrated, intelligent DSA controllers, with internal caching, enable DSSI to achieve linear, predictable I/O performance when you add storage devices. Performance optimization tools, such as the VAX Performance Analyzer (VPA) and the VMS Striping Driver, balance the I/O power of the DSSI subsystems with the processing requirements of the CPUs. This becomes especially important when you're running I/O-intensive applications.

Figuring Cost of Ownership

You can use DSSI across a range of systems and technologies—with our newest VAX 4000 or with members of the MicroVAX family. So not only can you take advantage of DSSI on new systems, but you can also upgrade your older systems and later migrate the storage. This is one more example of Digital's commitment to protecting your investment in existing equipment, one more example of how the Digital Storage Architecture lets you benefit from new technologies—without changing your current applications.

When you compare the full cost of ownership—including purchase price, maintenance expenses, residual value, *and* the cost of downtime, you'll see that raw specs and upfront prices may not be the most critical factors when evaluating the efficiency and cost of ownership of storage products.

The Future: A Family of DSSI Products

Digital is committed to continue introducing new DSSI devices—and faster VAX systems to run with them. For more information about DSSI, contact your Digital sales representative.

PATHWORKS for Integration

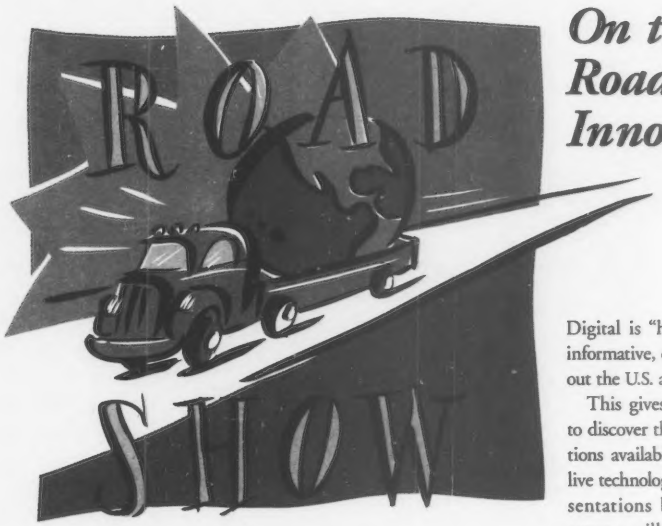
PATHWORKS is the new name for Digital's family of PC and Macintosh integration products. The PATHWORKS family enables users of Macintosh computers and PCs from a wide range of vendors to interconnect and share resources in a local area or a globally-connected environment. To date, products from the PATHWORKS family have been sold to more than 500,000 users.

Welcome CADRA CAD/CAM

CADRA CAD/CAM software is now available through Digital, thanks to a Digital Distributed Software (DDS) agreement with Adra Systems, Inc. The CADRA family of mechanical CAD/CAM applications comprises CADRA-III and CADRA-NC products that support design,

Bus Connections

Via integration of hardware and software from Simpact Associates, Inc., two new products—the DEC Commserver 100 and the DEC Commserver 150—now provide connections for non-Q-bus systems. These communications products are an ideal match for OLTP systems where industry-specific communications are required; they provide the flexibility and connectivity necessary for applications using VAX 9000, VAXft 3000, and MicroVAX 3100 systems.



On the Road to Innovation

Digital Technology on Tour

Digital is "hitting the road," bringing an informative, day-long event to cities throughout the U.S. and Canada.

This gives you a convenient opportunity to discover the total information system solutions available today. You'll see the latest in live technology demonstrations as well as presentations by industry leaders. Product experts will also be on hand for breakout sessions and to answer questions. Topics include: client/sever computing, the latest RISC/ULTRIX systems, imaging systems, networks, and high-performance media like FDDI.

Check the schedule to find out when the Digital tour will be in your area, then contact your local Digital office for complete registration information.

***Digital on Tour* 1991 Schedule**

Date	United States
2/5	Charlotte NC
2/7	Orlando FL
2/12	Miami FL
2/14	Atlanta GA
2/18	Tulsa OK
2/21	Minneapolis MN
2/28	Phoenix AZ
3/5	Los Angeles CA
3/7	Costa Mesa CA
3/12	Santa Clara CA
3/19	Albuquerque NM
3/21	Denver CO
3/26	Seattle WA
4/2	Pittsburgh PA
4/4 & 4/5	Detroit MI
Date	**Canada**
4/12	Halifax NS
4/16	Ottawa ON
4/18	Montreal PQ
4/24	Toronto ON
5/1	Winnipeg MN
5/7	Calgary AB
5/9	Edmonton AB
5/14	Vancouver BC
5/21	Victoria BC

VAX Vectors: For the Sheer Speed of It

VAX Vector Processing Brings Supercomputing Performance to Engineering

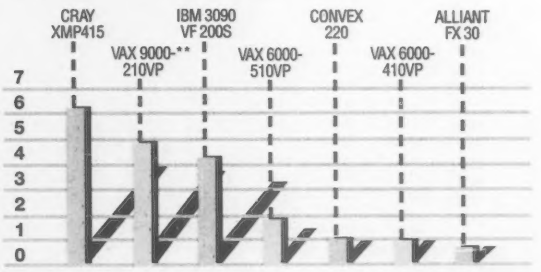
Shortly after the VAX-11/780 was introduced, it became the system of choice for engineering departments. While VAX engineering customers have benefited from significant performance increases over the years, it wasn't until just recently, with the introduction of VAX Vector Processing on VAX 6000 and VAX 9000 systems, that Digital entered the realm of supercomputing. Now, for example, a VAX 9000-210VP with vector processing offers up to 400 times the performance of the original VAX-11/780.

This level of supercomputing performance is critical for compute-intensive applications such as finite element analysis (FEA). FEA is at the heart of the engineering design and refinement process, where speed is of the essence. And speed is what VAX Vector Processing provides: an FEA run that once took 12 hours on a VAX-11/780 now takes less than two minutes on a VAX 9000-210VP.

In the past, such speed was available only from specialized supercomputing systems from Cray, Convex, and IBM. Today, with VAX Vector Processing, engineers and scientists can have supercomputing performance on a general purpose system—at a fraction of the cost of supercomputing systems from competing vendors. As a plus, popular FEA applications, including ABAQUS, ANSYS, and I-DEAS, are now available on VAX Vector systems. MSC/NASTRAN is targeted for availability this summer.

The accompanying chart shows how the VAX 6000 and VAX 9000 Vector Processors perform against the competition in industry-standard benchmarks for engineering design applications.

Perfect Benchmarks
Engineering Design (Baseline Results)*



*Relative positioning: VAX 6000-410VP=1.0
**Preliminary results

An engineering analysis run that once took 12 hours on a VAX-11/780 now takes less than two minutes on a VAX 9000-210VP.

Notes on chart:
ALLIANT, CONVEX, CRAY results taken from March 1990 Perfect Report: 2, Technical Report 964, Center for Supercomputing Research and Development, University of Illinois at Urbana-Champaign. IBM results taken from July 1989 Perfect Report 827.

Printing Good News

Here's a quick look at ways to maximize printing capabilities—while saving time and money too.

Fast, Affordable Printing within ALL-IN-1

If you use ALL-IN-1 V2.3 and V2.4, you can now expand your range of printing options with the ALL-IN-1 Printing Enhancements ASSETS Package from Digital's ASSETS program.

This package allows access to such DEClaser and PrintServer printer features as tray selection, envelopes (access through DEClaser only), two-sided printing, and all of Digital's value-added printing capabilities. These include the ability to print multiple pages of output on a single sheet of paper, and the ability to load and use soft fonts and soft letterheads. (The accompanying chart shows additional capabilities that come with this package.)

The ALL-IN-1 Printing Enhancements ASSETS Package greatly improves performance for multiple print operations with PrintServer printers. The package is easy to install and easy to learn, with a customizable, menu-driven format. And, since it's compatible with ALL-IN-1 V2.3 and V2.4, the package can use ALL-IN-1 upgrades.

The ASSETS part number for the ALL-IN-1 Printing Enhancements ASSETS Package is A1_PRINTING0. For more information, contact your Digital sales representative.*

FREE PrintServer Client Software

Digital is now providing ***FREE*** PrintServer Client Software for both TCP/IP and DECnet, bundled with ULTRIX V4.0 and above.

You can create print queues for PrintServer networked PostScript printers using the lprsetup utility. You're then ready to take advantage of our 20- and 40-page-per-minute PostScript printers. (The chart details the range of features at your print command.)

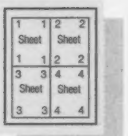


Fig. 1: Number_Up

Fig. 2: Portrait

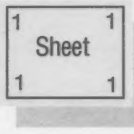


Fig. 3: Landscape

Fig. 4: Two-Sided

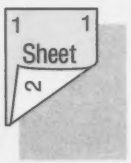


Fig. 5: Tumble

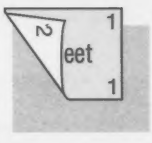


Fig. 6: Two-Sided Landscape

Commonly Used VMS Printing Parameters for PostScript Printers

To Do This Task...	Use These Parameters...	With These Qualifiers		For Example...
Print different types of data, such as PostScript files.	DATA_TYPE	ANSI DDIF PCL	POSTSCRIPT REGIS TEK4010	PRINT/QUEUE=*queuename*/PARAM=ANSI *filename*
Print documents on PostScript printers with DEClaser or LN03 font cartridges.	FONTS_USED	See the *DECprint Printing Services User Guide.*		PRINT/QUEUE=queuename/PARAM_FONTS_USED=CGTimes-10-12 *filename*
Specify input tray.	INPUT_TRAY	TOP MIDDLE BOTTOM		PRINT/QUEUE=*queuename*/PARAM=INPUT_TRAY=TOP *filename*
Print one or more pages per side. (See *Fig. 1.*)	NUMBER_UP	0-100		PRINT/QUEUE=*queuename*/PARAM=NUMBER_UP=4 *filename*
Specify output tray.	OUTPUT_TRAY	TOP or UPPER SIDE or LOWER FACE_UP		PRINT/QUEUE=*queuename*/PARAM=OUTPUT_TRAY=TOP *filename*
Determine first and last pages to print.	PAGE_LIMIT	1-10000		PRINT/QUEUE=*queuename*/PARAM=PAGE_LIMIT=2,8 *filename*
Print vertically or horizontally. (See *Figs. 2* and *3.*)	PAGE_ORIENTATION	PORTRAIT LANDSCAPE		PRINT/QUEUE=*queuename*/PARAM=PAGE_ORIENT=PORTRAIT *filename*
Print copies of each page.	SHEET_COUNT	1-10000		PRINT/QUEUE=*queuename*/PARAM=SHEET_COUNT=3 *filename*
Specify the sheet size.	SHEET_SIZE	LETTER A A3 A4 A5	LEDGER B B4 B5 EXECUTIVE LEGAL	PRINT/QUEUE=*queuename*/PARAM=SHEET_SIZE=LEGAL *filename*
Print pages on one or two sides. (See *Figs. 4* and *5.*)	SIDES	1 2 TUMBLE		PRINT/QUEUE=*queuename*/PARAM=SIDES=2 *filename*
Use more than one parameter.	Use up to 8 parameters separated by commas, enclosed in parentheses.	See the qualifiers available for the parameter.		PRINT/QUEUE=*queuename*/PARAM=(PAGE_ORIENT=LANDSCAPE,SIDES=2) *filename*

Commonly Used ULTRIX Printing Parameters for PostScript Printers

To Do This Task...	Use This Option...	With These Arguments		For Example...
Print different types of data, such as PostScript files.	-D	ansi tek4014	ascii postscript	lpr -P*queuename* -Dansi *filename*
Specify input tray.	-I	top middle bottom		lpr -P*queuename* -Itop *filename*
Print one or more pages per side. (See *Fig. 1.*)	-N	0-100		lpr -P*queuename* -N4 *filename*
Specify output tray.	-o	top or upper side or lower face_up		lpr -P*queuename* -otop *filename*
Determine first and last pages to print.	-Z	1-10000		lpr -P*queuename* -Z2,8 *filename*
Print vertically or horizontally. (See *Figs. 2* and *3.*)	-O	portrait landscape		lpr -P*queuename* -Oportrait *filename*
Print copies of each page.	-X	1-10000		lpr -P*queuename* -X3 *filename*
Specify sheet size.	-S	letter a a3 a4 a5	ledger b b4 b5 executive legal	lpr -P*queuename* -Slegal *filename*
Print pages on 1 or 2 sides. (See *Figs. 4* and *5.*)	-K	1 2 tumble		lpr -P*queuename* -K2 *filename*
Use more than one flag. (See *Fig. 6.*)		See the arguments available for this option.		lpr -P*queuename* -Olandscape -K2 *filename*

COMMENTARY

Michael Fitzgerald

Palmtops are not games

Most of us have seen one of those advertisements that show a notebook computer sitting in a briefcase.

The gist of these ads is that a notebook computer is as portable as anyone could need. And indeed, smaller computers — "palmtops" such as the Atari Portfolio and the Poqet Computer Poqet — and personal information managers such as Sharp's Wizard are typically sneered at by IS managers who find notebook computers perfectly acceptable.

So why, then, is Dataquest predicting that some 400,000 palmtops, or what it calls "subnotebooks" (not including products like the Sharp Wizard), will be sold in 1991?

And why does Gilbert Hoxie, an independent consultant in Los Angeles, predict that by mid-1992, these small systems will make up more than half the portables sold? The answer to this, perhaps, comes in part from the Japanese enthusiasm for palmtops from NEC and Fujitsu that weigh under 2½ pounds. But more likely, user demand will drive the market here.

"I have 350 field engineers, but they won't touch even a notebook computer. What am I

Continued on page 38

386DX faces looming shadow

ANALYSIS

BY RICHARD PASTORE
CW STAFF

Will the Intel Corp. 80386DX chip be the next obsolete technology? Many users appear to be passing over personal computers based on the 386DX in favor of its lower and higher end cousins. While some observers claim the 386DX is on its way out, others say it still has its place in niche applications.

The 386DX "is definitely being squeezed. The 20-MHz 386SX is moving upward, taking business away from the 20-MHz DX market," said Mark Levitt, an analyst at International Data Corp. In turn, increasing popularity of Intel I486-based PCs is eroding sales of 25- and 33-MHz 386DX systems, he said.

User buying patterns bear this out at the low end. "The platform we're moving to is the 386SX for our regular workstations," said Michael Purcell, manager of technical planning and information resources at Baxter Healthcare Corp.

"As stand-alone boxes, the SX has definitely taken a big piece of that market away," said Pat Calabrese, a PC sales representative at dealer Monterey Waldec in Tampa, Fla.

Although the 386SX employs only a 16-bit bus compared with the DX's 32-bit bus, in many cases there is little difference in functionality, observers said.

"Today, the customer loses very little in classic, single-user applications by moving to an SX over a DX," said Steve Lair, an analyst at Dataquest, Inc. "A 386SX 20-MHz PC will do the job for 95% of the users today."

One year ago, there was a noticeable difference in performance between the SX and DX chips, said Bruce Greif, project analyst at County Natwest, Inc. in New York. But with caching upgrades available today, the performance of the SX has caught up with that of the DX.

Side-by-side comparisons also showed up the 386DX. Comparing a Compaq Computer Corp. 20-MHz 386DX-based box with a Deskpro 386SX system, Robert Martin, a consultant at Deloitte & Touche in Cincinnati, said, "We really couldn't see any difference in performance running Microsoft's Excel product."

Narrow niche

Yet the 386DX still finds a narrow niche as a server in mid-size networks and for certain engineering applications. Also, the CPU-intensive Microsoft Corp. Windows 3.0 will eventually drive users to upgrade their SX platforms to 386DX systems, said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass.

The 386DX is also being pressured from above. As prices drop on 486-based PCs, they will further eclipse the 386DX in some managers' high-end plans.

Once the average price of a 486-based PC drops to $5,000, "you're going to see the 486 quickly become the next standard," predicted Frank Michnoff, an analyst at Meta Group, Inc. in Westport, Conn.

Some users are already being won over by competitively priced 486s. "I just bought an AST Research, Inc. Bravo 486/25 for evaluation," Greif said. With the box's attractive price/point, "why should I bother with a 386?" he asked.

For network servers, 386DX systems had been de rigueur at the State of Washington's Department of Social and Health Services. But the department recently switched its standard to what it considers to be the more cost-effective 486.

"Our local-area networks grow so quickly that [386DXs] rapidly run out of gas," said Stephen Anderson, the state agency's information systems architect. "If the price of the 486 keeps dropping, it won't be very long before you don't see a 25-MHz or 33-MHz 386."

Intel Chief Executive Officer and President Andrew Grove said in 1991, "the dominant chip will be the SX."

Some observers said they think Intel's rumored 486SX chip will further render the 386DX irrelevant.

West Coast Correspondent Maura J. Harrington contributed to this report.

T-shirt company Champions automated ordering process

ON SITE

BY RICHARD PASTORE
CW STAFF

ROCHESTER, N.Y. — If someone gave you the wrong-size

Champion *trims order errors with automated order entry*

Three Stooges sweatshirt for Christmas, you have probably already returned it. You are satisfied, but the T-shirt company is stuck with a slightly used Moe.

The losses get serious when customers such as Notre Dame's Fighting Irish football team return mismatched jersey orders. Champion Products, Inc., a manufacturer of silk-screened T-shirts, jerseys and Champion-emblemed sweatshirts, is hoping to trim costly order mistakes by equipping its field sales representatives with laptop personal computers and an automated order-entry system.

The number of variables in jersey specifications makes ordering as complicated as a trip to a tailor shop. "It's very easy to make mistakes," especially

Continued on page 43

Before we could satisfy the Baldrige Quality Award judges, we had to please an even more demanding panel of experts. Our AS/400 customers.

It's easy to say the customer comes first, but in the case of the IBM AS/400® computer system, it's literally true. Before there ever was an AS/400, there were customers helping us design it. And they've had a firm hand on the helm ever since.

At every step—from planning to production, from testing to retesting—our customers participate, telling us what they want and don't want, what works and what needs working on.

Then after we install an AS/400, we call the customer within 90 days to ask how things are going and to offer whatever help may be needed. As a result, customer satisfaction is virtually 100%.

These procedures are based on a simple notion: that quality is defined not by the people who make a product, but by the people who use it.

Not coincidentally, customer involvement and satisfaction were key to helping IBM Rochester, Minnesota, which designs, builds and supports the AS/400, win the 1990 Malcolm Baldrige National Quality Award.

Clearly, a lot of the credit must go to our customers, along with our business partners and suppliers. Their help has been essential to our success. Which is why our Baldrige award is their award, too.

To learn more about the IBM AS/400 quality story, call us at 1-800-365-4 IBM.

Malcolm Baldrige National Quality Award 1990 Winner

IBM®

Plenty of help available for Windows 3.0 users

ANALYSIS

BY PATRICIA KEEFE
CW STAFF

You have read the product reviews, wallowed in the hype about graphical user interface-inspired productivity hikes and perhaps even cracked the shrink-wrap on Microsoft Corp.'s red-hot Windows 3.0. The more adventurous may have dived right in, but for now, many companies are either evaluating Windows or politely recommending its adoption.

It has taken six years and three major releases for Microsoft's DOS-based Windows environment to finally catch fire. It has taken this long for the concept of a graphical user interface to seep into the mostly character-based user community's collective consciousness. For many people, then, Windows is not only new — it is foreign.

Help is out there, in forms ranging from vendor support, newsletters, bulletin boards, user groups and the Windows Users Group Network (Wugnet), an organization that claims to champion and support users.

Microsoft forms the first line of defense. In addition to telephone and field-support services that can reportedly handle up to 6,500 calls per day, there are classes available through the Microsoft University Program and several Microsoft forums on Compuserve. Other on-line services with forums include Genie and Byte Information Exchange.

Microsoft uses the forums to download updates, "application notes" and other technical information, but many users log on to learn from the "unbiased" experiences of other users, said Frank Riedelberger, manager of information systems development at Northern Telecom, Inc.'s Outside Plants Division in Morton Grove, Ill.

A wave of calls relating to early bugs overwhelmed Microsoft and overloaded Compuserve following the May 1990 release of Windows 3.0. Microsoft responded by opening a 24-hour automated hot line and expanding support hours.

A handful of publications specialize in Windows gazing. These include "The Wugnet Journal," Computhink, Inc.'s "Windows Watcher," "Acknowledge, The Window Newsletter" and "The Windows Shopper's Guide."

Playing a big role

User groups, with their access to peers' expertise and libraries of free programs and tips, play the biggest role in acclimating users to Windows. Casey Burns, the group leader for the Windows special interest group of the Pacific Northwest PC Users Group, said that for a time, his group was fielding questions that should have gone to Microsoft. "Most problems involve getting a certain program to work in a certain way vs. having problems with [Windows] from the start," Burns said.

These groups can be found in most major metropolitan areas, and others are still being formed. For example, Riedelberger, a Wugnet member, is launching one in the Chicago area. The group's first meeting was last week. He is being assisted by Wugnet. "They provided me with names of other users, helped us get in touch with users and provided insight into organizing a group," he said.

According to spokesman Joel Diamond, Wugnet functions as a "mechanism for other user groups around the world." Among Wugnet's services are discounts on software, a biweekly conference on Compuserve's Zenith Forum and its technical journal.

Corporate memberships are available for groups ranging from three users (starting at $250) to 100 users.

College takes cheaper road to Athena

ON SITE

BY J. A. SAVAGE
CW STAFF

SANTA CRUZ, Calif. — A nation away from here, MIT, Digital Equipment Corp. and IBM have so far spent eight years and about 80% of the more than $100 million needed to develop scalable client/server software for the university environment, called Project Athena.

The University of California at Santa Cruz gladly picked up the code for free from MIT. But when it came to laying out money for the hardware to base it on, the university went with cheaper workstations — not systems from Athena pioneers DEC or IBM. Santa Cruz spent its money on Sun Microsystems, Inc., opting for low-priced workstations.

"DEC had the advantage because parts of Athena already run on it; however, Sun's cost was better," said Tim Garlick, network analyst and project manager at the university.

The purchase, made in mid-January, followed a mid-1990 request for information from vendors and a November 1990 request for quotes from DEC, IBM and Sun.

Garlick said that moving to new equipment was necessary because the university's six DEC VAX 11/750s and two VAX 11/780s used on the academic systems are "really obsolete" and cost about $72,000 per year in maintenance. Five other VAXs used on the administrative side will be replaced as soon as possible.

In an ad hoc committee, Garlick, associate development engineer James Haynes and two computer science professors surveyed the available hardware and decided to implement an unusual configuration. Instead of using higher priced dedicated servers, the university will use Sun's basic workstations as servers. "We decided that the smaller machines will probably work," Haynes said.

"We can get more millions of instructions per second for the dollar by getting [Sun] IPCs rather than Sun servers," Garlick said. "If we find that it's not enough power, then we can incrementally add more relatively cheaply. That's more palatable to the people with the purse strings."

Andy Freeberg

Garlick *is using cheaper workstations to employ Athena at the University of California at Santa Cruz*

In all, the initial system will include 21 Sun SLCs, the vendor's lowest priced computer. It has no disk storage, although a 100M-byte disk will be added for booting the system, access to the network and short-term file storage, Garlick said. The SLCs will be end-user workstations.

Five larger Sun IPCs will be used as servers. One will be used to download programs to the SLCs, three will be file servers, and one will be a spare. Each will have a 397M-byte hard disk.

Each major campus division will have a Sparcstation 2 for academic use. Two more workstations will be available for student and faculty remote access.

Eventually, the sprawling, forested campus will have hundreds, if not thousands, of workstations — added a few at a time, according to Haynes.

From their basement offices next to the computer room, Garlick and Haynes will be taking on the project of switching to workstations practically by themselves during the next few months. They hope to get the help of a graduate student or two and to hire someone during the summer from MIT for software expertise.

"For the last year, we've been grabbing pieces of Athena and implementing it," Garlick said. The campus will use all of Athena's major components: Kerberos, a security system; Hezoid, a program to take the Internet academic network naming system and use it as a general service database; Moira, which automates routine management tasks; and Zephyr, the mail program.

At some point, Athena software will have to be redone because Sun will be moving to AT&T's Unix System V, Release 4 by the end of the year. At this point, the university is lobbying for Sun's help in porting Athena, but the company has not committed to it.

When it is completed, the university will have a large computer room with very little equipment in it. Garlick is not sure anyone will want the old VAXs. They may suffer the fate of the school's old IBM 4341, which has been turned into furniture: It is being used as a table for workstations so that they do not have to sit on the floor.

Fitzgerald

CONTINUED FROM PAGE 35

going to do?" asked the executive vice president of a midsize Midwestern building company at a Poqet-sponsored executive briefing.

Poqet sales executives jumped at the question like starving dogs at bones, which is understandable because Poqet's sales have so far been smaller than its one-pound, 8½- by 4-in. DOS computer.

The sales probably have been hurt by Poqet's apparent decision to design its machines to the exact physical needs of 12-year-olds. The screen even rivals that of Nintendo's Game Boy for starkness and lack of grace, although it is still usable, like the Game Boy. Still, few corporations employ 12-year-olds, and still fewer 12-year-olds can afford a Poqet, even at the newly reduced list price of $1,500.

The IS executive's question was so sanguine it seemed scripted, but the business card is real, as is his business' need for a small computer that does real work. A recent chat with the executive revealed that for him, the Poqet will be a real solution once 4M-byte flash memory cards become available later this quarter.

Currently, Poqet computers can only access information from flash memory — a credit-card-size, power-saving integrated memory circuit.

But it's difficult to see where 400,000 people like him will come from. And so Hoxie's prediction of market dominance looks rather dim on the surface.

According to Andy Seybold, portable computing analyst at Dataquest, the technology is there to go to the "companion" PC — a two- to three-pound full-function machine. But he says two things need to happen first: "There's got to be a change in people's philosophy and much better [data] communications."

Seybold says today's notebooks, with their ever-increasing storage capacities, lead most people to expect their portable to now be a lightweight version of their desktop PC, which is not going to happen in the palmtop market for the foreseeable future.

However, Seybold says that although users feel they need to have all that data with them on the road, they really do not need it; they just need to be able to get at it.

Seybold adds that as wireless communication improves, people will gain access to all of the data on their machines in their offices, making palmtops viable. The time line? 1991.

Hoxie points to the flash card.

"[It has] the potential to revolutionize the portable market," he says. "Rotating memory and backlight are the bane of batteries. This thing gets rid of two kinds of rotating memory: hard disk and floppy."

Still, there is the obvious problem of available software for the flash card medium. But Hoxie, Seybold and others say that a breakthrough product in what they call the "convenience computing" field will hit the market by May, giving users — maybe even 400,000 users — a reason to buy palmtops.

That, plus upwards of a dozen vendors rumored to be developing palmtops — including Dell Computer, Toshiba America and Hewlett-Packard — might have a significant number of palmtop users saying, "It ain't heavy; it's my computer."

Fitzgerald is a *Computerworld* Midwest bureau correspondent.

Floppyworks eases file shift

BY CAROL HILDEBRAND
CW STAFF

Next, Inc. users can now get there from here a whole lot easier.

With the advent of Floppyworks file-transfer software from Digital Instrumentation Technology, Inc. in Los Alamos, N.M., users can now take a more direct route when transferring files to their black boxes.

The package particularly simplifies the transfer process between Next and Apple Computer, Inc. Macintoshes using 1.44M-byte floppy disks.

According to company spokeswoman Liz Shrum, Floppyworks obviates the need for Apple File Exchange software, which requires a user to switch a Macintosh file to MS-DOS before it can be transferred over to the Next environment.

With Floppyworks installed on a Next machine, users call up two browser windows that show the Next files and the floppy files.

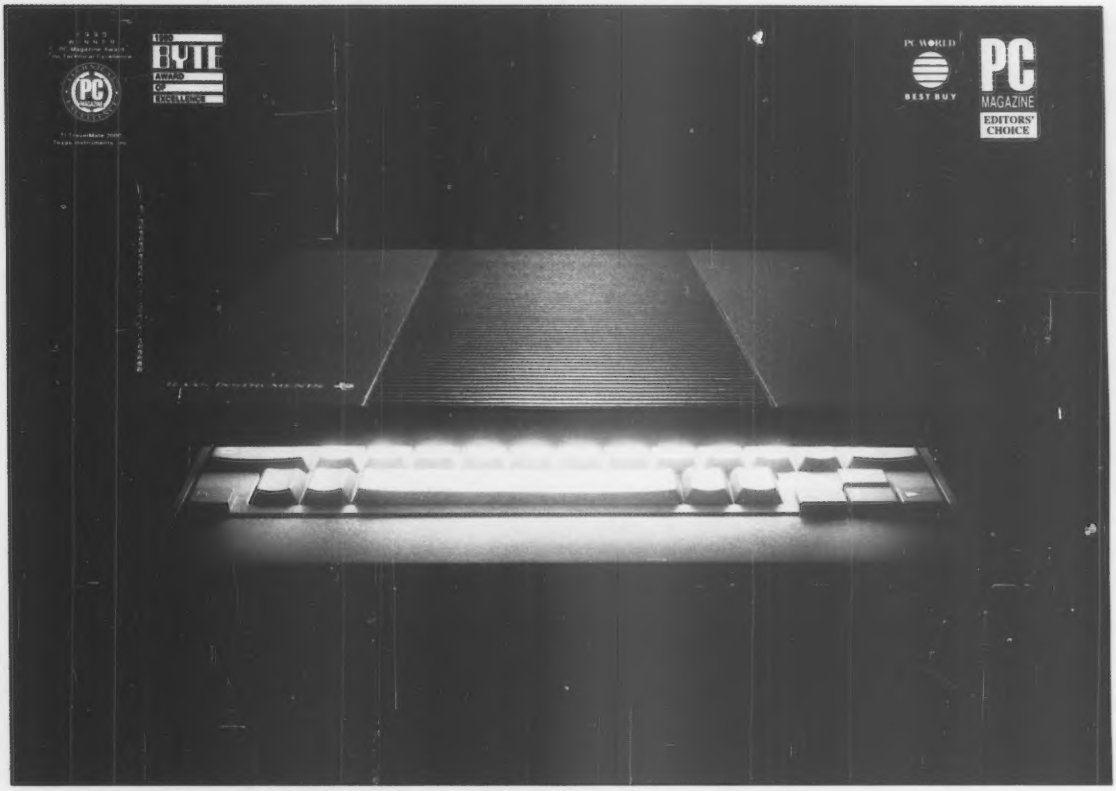
"Say you want to put a Mac file on the Next system," Shrum said. "You just highlight that Mac file, push the copy button, and it will copy over to the Next system and show it in the Next window."

A filter function aids in translating information among different formats such as word processing, graphics and databases, and a duplicating feature allows multiple copies of a floppy disk.

The package will also format, read and write MS-DOS and OS/2 files in 720K, 1.44M- and 2.88M-byte formats. It will run on the Next machines's internal disk drive, as well as drives from Digital Instrumentation and Peripheral Land, Inc.

Floppyworks retails for $250, the company said.

The new look of power.



286 processing in a computer that's notebook size, 1.4" thin and 4.4 lbs. light.

Introducing the TI TravelMate™ 2000 notebook computer – from the company that pioneered portable computing solutions.

Since inventing the first portable data terminal in 1969, TI has led the way in packing more and more functionality into smaller and smaller products. Now TI brings you the next generation in portable computing – the TravelMate 2000.

This sleek, 4.4-lb. notebook computer gives you the power of a PC-AT® in an ultrathin 8½" x 11" package. It's designed to fit your workstyle – wherever you work – in the office, at home or on the road. Just slip it in your briefcase with your file folders, journals and other business materials, and you're ready to go.

Large VGA screen with leadership display technology.

You'll appreciate the technology behind the 10" diagonal VGA display. It's a remarkable feature for a computer that's notebook size. The high-resolution 640 x 480 supertwist screen easily handles demanding windowing and graphics applications.

More features to meet your application needs.

The TM 2000 has the power to run your favorite software – 12 MHz 80C286 processor, 20MB hard disk drive and 1MB of RAM. A built-in, rechargeable battery lets you work up to two hours. With an optional add-on battery, you can work up to five hours – enough for coast-to-coast flights.

You also get a full-function AT enhanced keyboard, so you can work with the same feel of your desktop PC.

In addition, we've loaded MS-DOS® and LapLink™ in ROM, and preformatted the hard disk.

For more information call **1-800-527-3500.**

TEXAS INSTRUMENTS

Few flaws in NCR's powerful Micro Channel PC

Technology Analysis — A roundup of expert opinion on new products. Summaries written by freelance writer Suzanne Weixel.

NCR Corp.'s PC486/MC25 combines the power of Intel Corp.'s 486 microprocessor with Micro Channel Architecture to achieve what most reviewers agree is an impressive piece of technology.

Performance: The PC486/MC25 has a 128K-byte interleaved secondary memory cache designed to handle sustained transfers of data to match the 486 processor's 128-bit burst mode. According to reviewers, this feature really boosts speed. In addition, the PC486/MC uses a small computer systems interface controller, and although it is slower under DOS than enhanced small device interface controllers, it can manage up to seven devices simultaneously.

Compatibility: According to *PC World*, the NCR PC486/MC can function as a server with an IBM Token-Ring board installed. It is also compatible with the Hayes Microcomputer Products, Inc. 2400P internal modem.

Support: NCR offers free on-site service — a big plus, according to reviewers — but there is no telephone support line.

Value: The NCR PC486/MC25 is a well-designed, compact desktop unit. For $14,389, you get a standard configuration that delivers much better OS/2 performance than an Industry Standard Architecture-based 486 system.

Server Capabilities: Because of its compatibility with networking hardware and software, reviewers consider the PC486/MC25 well suited to the job of a network server.

Reviews Summary

Criteria	PC Magazine 5/90	PC Week 8/13/90	LAN Times 8/90
Performance	Good	Very good	Good
Compatibility	NC	NC	Good
Design	Good	Stands out	Good
Support	Good	NC	NC
Value	Fair	NC	NC
Reviewer's score	NC	NC	7.3

Numeric ratings are based on a weighted scale of 1 to 10 where 10 is best. NC: No comment. These are excerpts from reviews. Refer to actual articles for details.

RATINGS

- Users: Paul Gallico, Toys 'R Us (*performance:* 10, *cost:* 10); Sree Raghavan, Beatrice/Hunt-Wesson Foods (8,7); Ken Albright, Great Lakes Bancorp (9,8) "We use it to run a time-consuming analysis package that used to take us eight hours. Now it takes two," Albright said.
- Analyst: Egil Juliussen, Workstation Labs (7,7)
- Financials: William O'Connor Jr., Fourteen Research, Inc. (*overall rating:* 9); William Baker, McDonald & Co. Securities, Inc. (8)

NCR had $6.3 billion in revenue for 1990, compared with $5.9 billion in 1989. Net income was $369 million in 1990 and $412 million in 1989.

NCR PC486/MC score: 79

Points (maximum)	Category
22 (30)	Published reviews
14 (20)	Analysts' ratings
14 (15)	Users' ratings
16 (20)	Cost evaluation
13 (15)	Vendor financials

(Maximum score: 100)

NCR responds

Comments from Bruce Langos, director of product-line management:

Performance: In a multitasking environment, the small computer systems interface controller really shows its capability.

Support: As far as whether the possible AT&T acquisition would have any impact on the sales, service and support of PCs, logic would say not. Why would anyone want to disrupt a good thing?

A poor server, ALR's clone succeeds as workstation

ALR Powercache 4 score: 77

Points (maximum)	Category
23 (30)	Published reviews
18 (20)	Analysts' ratings
12 (15)	Users' ratings
16 (20)	Cost evaluation
8 (15)	Vendor financials

(Maximum score: 100)

Reviews Summary

Criteria	Infoworld 8/27/90	PC Week 8/13/90	LAN Times 8/90 (4e)
Performance	Excellent	Very good	Excellent
Compatibility	Very good	NC	Average
Design	Satisfactory	Optimum flexibility	Average
Documentation	Very good	NC	NC
Value	Very good	NC	NC
Reviewer's score	7.5	Delivers on 486 promise	NC

Numeric ratings are based on a weighted scale of 1 to 10 where 10 is best. NC: No comment. These are excerpts from reviews. Refer to actual articles for details.

RATINGS

- Users: Bruce Greif, County Natwest, Inc. (*performance:* 6, *cost:* 8); Michael Vandermore, Diversified Computer Services (10,10)
- Analyst: Egil Juliussen, Workstation Labs (9, 6.5)
- Financials: Eric Zimits, Rauscher Pierce (*overall rating:* 5); Jim Weil, Soundview Financial Group (6).

ALR's revenue was $172 million for 1990, compared with $73.1 million in 1989. Net income for 1990 was $11.5 million, compared with $2.8 million in 1989. "[ALR] seems to be doing quite well, but they're less financially mature than Compaq or Dell. Their gross margins were low for the past quarter due to aggressive discounting," Zimits said.

Advanced Logic responds

Comments from David Kirkey, vice president of marketing:

Support: Our dealers are highly qualified to support the product. They offer on-site service.

Server Capabilities: We have large, successful installations using Powercache 4 systems on Netware networks. People often question the capabilities of the Micro Channel Architecture; we think it is powerful and dependable. If our customers asked for a case lock, we would put one on.

Advanced Logic Research, Inc.'s Powercache 4 may fall short as a network server, but as an Intel Corp. 486-based workstation with Micro Channel Architecture (MCA), it offers exceptional performance and a competitive price, reviewers say.

Performance: The Powercache 4 comes in desktop and tower models. It supports up to 32M bytes of random-access memory and is among the fastest 486-based PCs tested, according to reviewers.

Compatibility: The Powercache 4 offers excellent software compatibility, but, according to *Infoworld*, it would not work with an IBM 8514/A MCA video adapter.

Documentation: The spiral-bound documentation that comes with the Powercache 4 is well organized and easy to read.

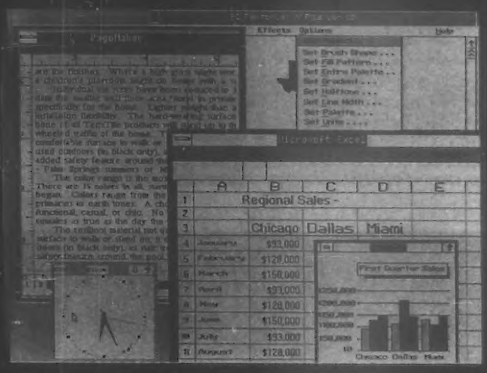
Support: Reviewers report that the swing-out arm design on the tower model makes servicing the Powercache 4 very easy. Basic support policies include a one-year warranty and free (but not toll-free) telephone support.

Value: The Powercache 4 is priced from $9,500 for a desktop workstation model up to about $16,500 for a tower case with a 650M-byte hard disk and controller with a 32K-byte cache. However, for a comparable price, ALR's Powercache 4e — the same system with an Extended Industry Standard Architecture bus — offers far superior server performance.

Server Capabilities: According to reviewers, the Powercache 4 has serious performance problems as a server for Novell, Inc.'s Netware 386 Version 3.0. In addition, it has only four open expansion slots after configuration and does not have a case lock.

Methodology: *Published reviews: average of numeric scores from product reviews published by PC publications listed in reviews summary chart multiplied by three. All ratings are based on a 1-to-10 scale, where 10 is excellent. Analysts: average overall product ratings multiplied by 2. Users: average overall product ratings multiplied by 1.5. Cost: average cost to get product up and running ratings from both groups multiplied by 2. Financials: average of analysts' ratings of vendor financials and ability to support product from financial analysts multiplied by 1.5.*

The new look of power just got more powerful.



1990 BYTE AWARD OF MERIT

PC Computing MVP

The new TravelMate™ 3000 notebook computer packs 386™ SX power into 1.8" and 5.7 lbs.

Finally. A truly portable 386SX notebook computer attractively packaged in a sleek, breakthrough design that complements your workstyle – TI TravelMate 3000. This latest addition to TI's powerful new look of notebook computers packs 20 MHz, 386SX processing power into a convenient 1.8" thin, 5.7-lb. package.

Portable power for power users.
Now you can easily carry desktop performance in an exceptionally lightweight package. Run power-hungry applications with 2MB of RAM (expandable to 6MB) and a 20MB, 40MB or 60MB hard disk drive. Get the full effect of Windows® and graphics-intensive software on the TravelMate 3000's big, bright 10" diagonal

The new 20 MHz 386SX TM 3000 is just 8.5" x 11", a mere 1.8" thin and weighs an easy-to-carry 5.7 lbs. (including battery)!

VGA display with 32 shades of gray. Loading application software and file back-up are easy with the built-in 3.5" floppy diskette drive. The internal battery lets you work up to three hours nonstop. Plus, the TravelMate 3000's full-function AT®-enhanced keyboard lets you do it in comfort.

Call today for power without compromise.
To see the new look of 386SX power, call TI for the name of a TM 3000 dealer near you.
1-800-527-3500

TEXAS INSTRUMENTS

EDI comes to the Mac

BY JAMES DALY
CW STAFF

SILVER SPRING, Md. — The emerging world of electronic data interchange (EDI) technology, which allows electronic documents to be exchanged from one computer system to another without manually rekeying the information, reached the Apple Computer, Inc. market recently with the introduction of the first EDI product for the Macintosh line.

Digit Software, Inc.'s Mac EDI is an EDI management system that was designed for application-to-application exchange of routine business transactions, according to Digit Software President Todd Ross. It is built around the ANSI X12 syntax standard and is now available for $1,950.

EDI differs from facsimiles and electronic mail in that its transactions are intended to be read by computers rather than humans. Virtually any type of transaction can be exchanged using EDI, including purchase orders and invoices.

The technology has been catching on in recent years as a way to streamline intercompany business communication. Input, a Mountain View, Calif.-based market research firm, estimated that 20,000 companies use EDI and said it expects 5,000 new businesses to add EDI capabilities this year.

The advantages of EDI, however, have so far eluded Apple users. While EDI has made inroads among networks of IBM Personal Computers and their clones, a similar product has not existed for the Macintosh. Why? "Look at the numbers: The Mac only makes up 10% of the market, if that," Ross said.

Early Macintosh EDI users said it is a product that has been worth the wait. At Bloomingdale's department store in New York, Macintosh EDI is used to replenish empty store shelves by communicating purchase orders to clothing and linen vendors.

Kodak network printer debuts

BY RICHARD PASTORE
CW STAFF

To distinguish their entries in the crowded page-printer market, vendors have been adding multiple capabilities to new printers, including network support as well as facsimile and copier operations. While some multifunction printers have already debuted — Xerox Corp. announced its $220,000 Docutech last fall — Eastman Kodak Co.'s new offering will be considerably lower end and lower cost.

The Kodak Ektaplus 7016, announced last week, is a desktop 16-page/min. printer that supports up to four individual IBM Personal Computers and Apple Computer, Inc. Macintoshes or four separate networks. The Ektaplus also features a built-in 6-page/min. copier that can be used for ordinary photocopying.

The printer, which starts at $5,495, is Kodak's first desktop multifunction printer and its first to support networks.

Kodak's target markets for the Ektaplus are small work groups with mixed DOS and Macintosh environments in medium to large-size companies.

While the firm is emphasizing the machine's networking ability, its distinctiveness stems more from its copier capability, said Marc Boer, an analyst at BIS CAP International, Inc. in Norwell, Mass.

Based on a Kodak-built LED engine, the printer features 30 resident fonts and for $1,995, optional Adobe Systems, Inc. Postscript fonts. The unit includes emulations such as Hewlett-Packard Co.'s Printer Control Language, Epson America, Inc.'s FX80 and IBM's Proprinter.

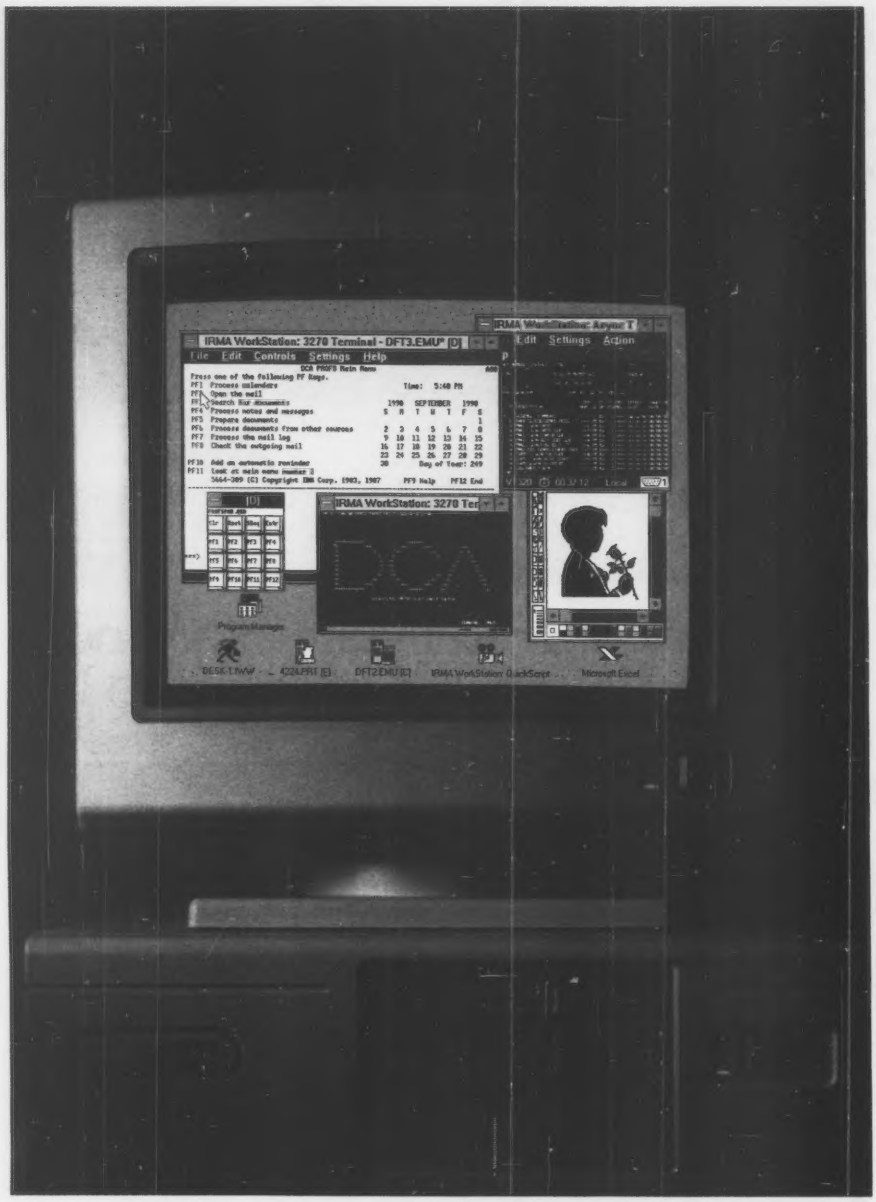
Multiprocessors get boost

DALLAS — The Santa Cruz Operation (SCO) and Corollary, Inc. introduced a jointly developed multiprocessing operating system at Uniforum last week designed to run on Intel Corp. I486-based machines.

The operating system combines the SCO Unix operating system with Corollary's proprietary multiprocessing kernel. The software is designed to allow SCO Unix users to run off-the-shelf software without any adjustments. It was also designed for use with a special chip set made by San Jose, Calif.-based Chips and Technologies, Inc. that is designed to boost the power and performance of up to six microprocessors in any commercially available 486-based multiprocessor machine, according to a Chips and Technologies spokesman.

The four-chip Multi/Processor Architecture Extension (M/PAX) chip set can help boost the power of a multiprocessor machine by balancing the shared system functions.

M/PAX chip set also has the firm's proprietary Modular System Architecture, which allows symmetrical attachment of either complex instruction set computing or reduced instruction set computing processors within the same system. Pricing and availability have not been announced.



Champion

CONTINUED FROM PAGE 35

when the representatives were doing everything manually, said Peter Youngman, director of major projects at Rochester, N.Y.-based Champion.

The homegrown menu system eliminates the need for representatives to write or type any of the complicated style, size and color codes for the 42,000 retail shirt designs. "They don't type 003 for a code or b-l-a-c-k for a color," Youngman said. "All you have to know is where the enter key is and the arrow keys."

The company, now a division of Sara Lee Corp., recently finished equipping its 60-person retail field force with Compaq Computer Corp. SLT 286s. Beginning this month and extending through the year, Champion will roll out 100 SLT 386SX machines to its athletic and institutional sales group.

Faster with less mistakes

The total reduction in order errors among both field sales groups will pay for the system in just under three years, said Michael Moore, vice president of MIS.

The representatives access headquarters and upload orders via a 24-hour, toll-free, 2,400 bit/sec. line. The orders are updated nightly to Champion's Unisys Corp. A17 mainframe. From there, mainframe-based applications process the order fulfillment.

The SLTs provide inquiry access to the mainframe as well. A salesperson can check order status and current and projected inventories over the same dial-up lines.

"If a customer says he needs a shipment Aug. 15, you can look at what's available in inventory for Aug. 15 and make your promises from there," Youngman said. Field representatives previously had to rely on paper inventory updates that were two weeks old by the time they arrived in the mail.

The mainframe, which holds the customer and master product databases, can download data such as design changes, customer address changes and the locations of new customers to the laptops. Champion is establishing a CC:Mail, Inc.-based electronic-mail service that will alert sales representatives to updates.

The laptops also save time in up-front order processing. "Prior to the SLT, they had to handwrite orders and mail them into a central office, or as we called it, 'the black hole,' " Youngman said. The orders would then languish on office desks for up to three weeks before data entry personnel could retype them into the mainframe.

With lead time reduced to 24 hours, Champion's internal reaction time is more immediate. "We have a hold on customer demand that much quicker," which leads to better inventory planning, Youngman said.

All hands in the pie

The system design and implementation were a team effort, Moore said. A task force of sales representatives was assigned the job of shaping the parameters. Because the resulting system was not an information systems design, the sales staff was told to direct any complaints to fellow sales representatives who helped set the parameters.

In addition, Champion's information center manager Chris Klietz and her staff members provide all training in-house. Field representatives fly into Rochester in groups of six and spend 70% of class time just working with the machines. The information center also runs a field representative support hot line.

The MIS department recommended the hardware for the task force's review. Compaq's SLT had the 40M-byte disk capacity necessary to contain a database of English descriptions of 42,000 designs. Also, "we felt it was a solid piece of equipment," Youngman said.

Because it experienced only a few minor mechanical problems with the LTE 286s, Champion has ordered 100 SLT 386SXs for its next rollout. The 386SXs will be equipped with 100M-byte hard disks, a capacity required to hold the athletic and institutional line's 500,000-design library.

Champion's IS group is now evaluating installing a minicomputer or high-performance PC at headquarters to act as a bridge between the laptops and the mainframe, Moore said. The new machine would handle all file transfer and inquiries processing, reducing contention for time on the mainframe, which already supports more than 500 users.

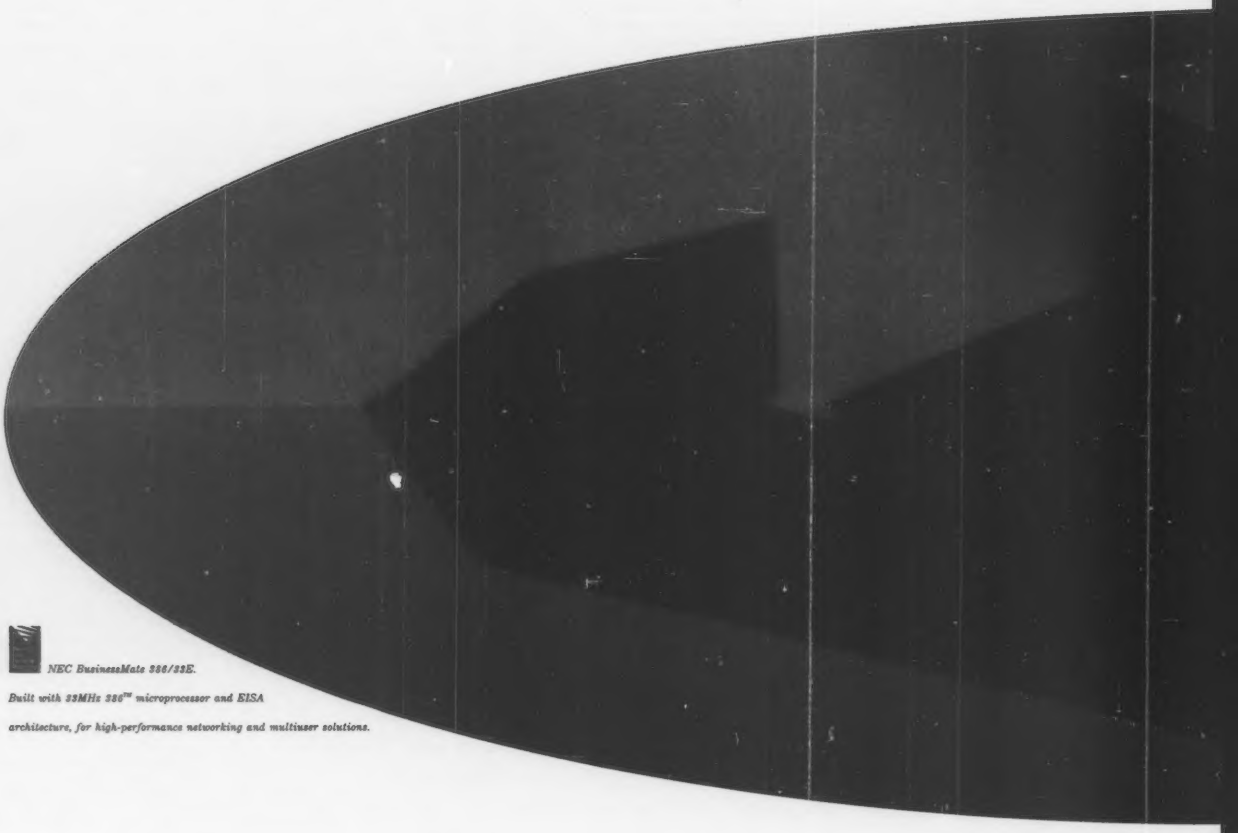
Bull develops DOS/Unix system

BILLERICA, Mass. — Hoping to emerge as a serious contender in the vendor race to bridge the DOS and Unix worlds, Bull HN Information Systems, Inc. recently unveiled the DPX/Prostation, a system that comes bundled with several popular software packages.

Positioned as a workstation for business applications, the Intel Corp. 25-MHz, 1486-based platform combines The Santa Cruz Operation's SCO Unix with MS-DOS support via the Locus Computing Corp. Merge Version 2.0 program. Prices start at $12,995.

Programs bundled with the system include Ingres Corp.'s Ingres SQL database, Informix Software, Inc.'s Wingz spreadsheet, Frame Technology Corp.'s Framemaker publishing package and Alfalfa Corp.'s Poste software.

Perhaps its best fea



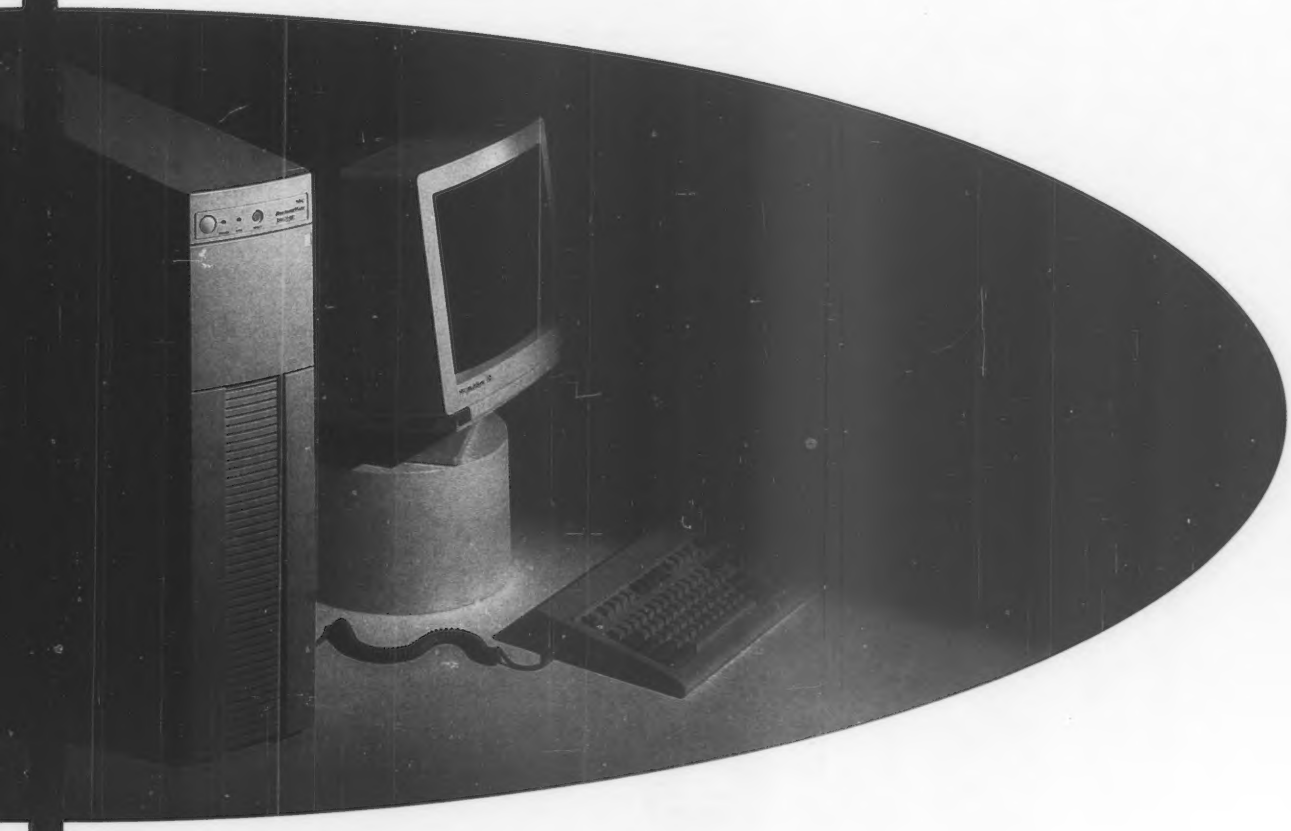
NEC BusinessMate 386/33E.
Built with 33MHz 386™ microprocessor and EISA architecture, for high-performance networking and multiuser solutions.

If you see networking and multiuser solutions in your company's future, there's no better investment than the NEC BusinessMate® 386/33E. Because it gives you the performance, capacity and expandability these environments demand.

It comes with 4MB or 8MB of RAM, a 64KB SRAM cache, and room for three full-height and three half-height storage devices. Its 32-bit EISA architecture accepts 8-, 16- and 32-bit cards among eight

C&C
Computers and Communications

ture is its future.



expansion slots. And its NEC Host Adaptor supports up to seven SCSI devices, for increased flexibility with no sacrifice in performance.

In short, with support for thousands of applications, you'll have the power to make your system grow and change as your needs do. Best of all, you'll have a system that offers something no one else can offer at any price: NEC. Which may be the most attractive feature of all.

For more information, call 1-800-NEC-INFO.

NEC

NEW PRODUCTS

Software utilities

Alpha Software Corp. has announced Dbquick, a memory-resident utility program designed for IBM Personal Computer XTs, ATs, Personal System/2s or compatibles.

The product enables users to browse and access data stored in Ashton-Tate Corp. Dbase-format database files by allowing the information to pop up over on-screen word processing and spreadsheet applications, the vendor said. Users may also reportedly display records in form views or table views and paste a formatted address from a database into a word processor.

Dbquick is priced at $99.

Alpha Software
One North Ave.
Burlington, Mass. 01803
(617) 229-2924

Insight Development Corp. recently announced Mosaic for Macintosh, a software package that enables Apple Computer, Inc. Macintosh users to print documents from any application on Hewlett-Packard Co. Laserjet and Deskjet devices attached to a Novell, Inc. network. A copy of Novell's Netware Desk Accessory is being bundled with Mosaic for Macintosh.

System requirements include a Macintosh system with a minimum of 1M byte of memory and Version 6 or higher of the Macintosh operating system.

The product is priced at $395 for three users and $595 for 10 users.

Insight Development
2200 Powell St.
Emeryville, Calif. 94068
(415) 652-4115

Data storage

Tradewinds Peripherals, Inc. has announced two hard disk drives that can be externally connected to IBM Personal Computer XTs, ATs or compatibles.

Pocketdisk Model PD20-1 ($895) was designed exclusively for desktop systems. Model PDH20-1 ($950) can also be used with any laptop system that can accommodate a half-card expansion board. Both 20M-byte drives feature 23 msec access times.

Tradewinds Peripherals
2633 E. 28th St.
Long Beach, Calif. 90806
(213) 595-7272

CD Technology, Inc. has introduced its 200M-byte HD Porta-Drive, a portable hard disk drive that operates with a small computer systems interface that ensures Apple Computer, Inc. Macintosh and IBM Personal Computer compatibility.

The device includes a Conner Peripherals, Inc. CP-3200F drive mechanism that enables it to yield an average access time of 15 msec, the vendor said.

The product's list price is $1,995, and a 100M-byte version costs $1,195.

CD Technology
780 Montague Expwy.
San Jose, Calif. 95131
(408) 432-8698

Mega Drive Systems, Inc. has announced a 3½-in., 425M-byte portable hard disk drive designed for systems such as IBM Personal Computer XTs, ATs, Personal System/2s, Intel Corp. 80386- or I486-based compatibles and Apple Computer, Inc. Macintosh systems.

The MDS-P425 features a 9-msec access speed and has been tested at a 75,000 hour mean time between failure, according to the vendor.

The drive is priced at $4,999.

Mega Drive Systems
1900 Avenue of the Stars
Los Angeles, Calif. 90067
(213) 556-1663

Peripherals

Sony Security Systems has announced three video printers designed for various printing tasks.

The UP-910 black-and-white printer can yield 6- by 8-in. prints in fewer than 25 seconds, according to the vendor. It also features 128 levels of gray.

The UP-610 is a small-format black-and-white unit that produces 2⅛- by 3½-in. prints and peel-off, adhesive-backed prints. The UP-3000 color printer reportedly produces color outputs of photographic image quality.

Pricing ranges from $2,000 to $3,895, depending on model.

Sony Security Systems
3 Paragon Drive
Montvale, N.J. 07645
(201) 358-4954

Advanced Vision Research, Inc. has announced two scanners designed for Apple Computer, Inc. Macintosh environments.

The AVR 3000/CL Plus color scanner ($2,590) can reportedly scan an 8½- by 11-in. page in less than 100 seconds. The AVR 3000/GS Plus gray-scale model ($2,090) can be equipped with a field service upgrade that enables it to scan colors. The color upgrade is priced at $995.

Adobe Systems, Inc.'s Photo Shop LE, a gray-scale/color image editing software package, is being bundled with both scanners.

Advanced Vision Research
2201 Qume Drive
San Jose, Calif. 95131
(408) 434-1115

Northern refocuses on networking strengths

Synergizes data products with office offerings

ANALYSIS

BY ELISABETH HORWITT
CW STAFF

RICHARDSON, Texas — After several ill-starred attempts to invade the end-user data networking market, Northern Telecom, Inc. has fallen back, regrouped and focused on synergizing its one successful data networking product, Data Packet Network (DPN), with its mainline central office offerings. This is the strategy being followed by Michael Doss, the recently appointed vice president and general manager of the company's data networking division. The strategy could turn out to be a winner.

By far, the biggest portion of Northern's revenue over the past few years has come from its central-office business, which held about 42% of the total U.S. market and made up 64% of the firm's $6.8 billion in revenue last year, according to Michel Guite, a vice president at Salomon Brothers, Inc.

In contrast, the customer premises equipment (CPE) side of Northern's business contributed about 24% of 1990 revenue, Guite said. The lion's share of that segment came from the private branch exchange (PBX) — or voice networking — side of the business. The data side shrank even further recently when Northern discontinued Lanstar [CW, Dec. 10].

Northern Telecom's Doss *regroups and tries new success strategy*

The decision to jettison Lanstar was part of an overall strategic direction to get out of those market niches that have no clear demand for Northern's strengths, Doss said. Lanstar, a high-speed, twisted-pair offering, was losing ground to the emerging 10Base-T products.

Lanstar was the latest in a series of withdrawals on Northern's part (see story this page).

"In 1983, it seemed as if Northern had as good a chance in customer premises equipment as in the central office," said Joaquin Gonzalez, vice president of global networking strategies at Meta Group, Inc. in Westport, Conn. Unfortunately for Northern, it made the mistake of trying to tie its PBX products in with its data communications equipment, he added.

Not that Northern was the only vendor to make that mistake. Indeed, Northern's loss of approximately $300 million was small compared with the "several billion dollars" that companies such as NEC Corp. lost from trying to combine computing and networking into one system, Guite said. "And IBM's loss from the Rolm venture was also substantial."

However, while competitors either cut their losses, which IBM did, or found successful niches, as AT&T did, Northern continued to flounder in the end-user data networking field, because it never quite identified

Continued on page 52

Wasted efforts?

If Northern has not managed to cut a swath in the customer premises data networking market, it is not from lack of trying. Its less successful efforts in that direction have included the following:

- In the early 1980s, Northern made a push to convince users that PBXs make great data as well as voice networking devices. It upgraded its existing SL family of PBXs to handle data and image as well as voice. However, users turned instead to local-area networks, which were designed to support data from the start and did not share PBXs' throughput limitations.
- In 1985, Northern introduced the DV-1, a combination switch and proprietary minicomputer targeted at the office automation market. However, users were not interested in running their office applications on a PBX switch, however intelligent, and the DV-1 died a quiet death.
- Also in 1985, Northern introduced Lanstar, a proprietary data networking hub that was said to deliver 2.5M bit/sec. rates over unshielded twisted-pair wiring. While Lanstar gained several enthusiastic supporters in the user community [CW, Dec. 10], their numbers barely exceeded 100 last month when Northern officially pulled the plug on the product.
- In the fall of 1988, Northern announced the Meridian Data Networking System, a multipurpose, proprietary switch that was designed to link LANs, hosts and personal computers to wide-area networks via a variety of protocols. The system was quietly discontinued in the summer of 1989.

ELISABETH HORWITT

Novell networking strategy questioned

BY JIM NASH
CW STAFF

Novell, Inc. promised last week to address users' concerns about what they perceive to be a meandering network management strategy.

A Novell spokesman said the Provo, Utah-based company will unveil its first "formal network management [strategy] statement in a matter of weeks." Gerry Machi, director of marketing for Novell's communications products, said much of the company's management work has been done behind the scenes, without fanfare.

Dissatisfied users have pointed to the late delivery of two management applications, Netware name service and remote management facility, as indications that management is not a priority. Novell's statement may come in the nick of time.

Tom Wood, an analyst at Business Research Group in Newton, Mass., said a study of 500 large companies indicated that Novell could fall from a solid 57% installed base in the nation's biggest firms down to 44% within 18 months. Wood said Novell losses are likely because of aggressive development from competitors Microsoft Corp. and Banyan Systems, Inc.

"Our largest development team is working on network management," Machi said. That team has pushed out Name Services, Lantern, Communications Service Manager and Remote Management in the last year, he explained.

Dissatisfied customers

Analyst Mary Modahl at Forrester Research, Inc. in Cambridge, Mass., said managers are growing impatient with incomplete management tools. She noted that a recent study showed that most vendors at best target their own product line with such tools. In some cases, vendors have management software and hardware for individual product lines.

"I want to be able to see what's going on in all of the other [Netware] 386 servers around the network," said Sheldon Laube, national director of information and technology at Price Waterhouse. Laube said he does not have that ability from his New York office. Ideally, he said, he would like to configure and manage his work groups as a wide-area network without the need for dial-up communication.

Jeff Larimore, information systems director at Home Intensive Care, Inc. in North Miami Beach, Fla., said management does not appear to be a priority for Novell. Larimore is in the midst of upgrading his Netware 286 to Netware 386. He said Netware 386 does not have the same management utilities found in 286.

For example, Larimore said, File Server Console, a utility in Netware 286, is absent from the upgrade. F Console, as the utility is known, "gives you some pretty comprehensive statistics, like current server utilization. You can look at file-lock connections, and there are some remote console abilities," he said.

Some of those capabilities are standard on Netware 386, and some are available as Netware Loadable Modules, according to Larimore, but others seem to be missing from Netware 386 altogether.

Available tools are not user-friendly, he said. "You have to know [Netware 286] pretty well to understand [management screens] very quickly," Larimore said. "It's difficult to interpret stats and act on the data."

Analysts look to Netware Name Service as an indication of Novell's intentions. Craig Burton, chief executive officer at Clarke-Burton Corp., a network consulting firm in Salt Lake City, has criticized the utility as a late and incomplete entry into the naming game. As an extension of Netware, Burton has argued that it should have been introduced long ago. It was, in fact, delivered last month — six months behind schedule.

He referred to the naming utility as a "tactical" product, one that does not offer global naming as does competitor Banyan Systems' Streettalk.

Falling behind

David Eison, telecommunications coordinator at Memorial Medical Center in Jacksonville, Fla., said Novell "is either slow to deliver or slow to develop." In the face of a flurry of third-party management tools, Eison said, Novell seems to be bringing up the rear.

While Novell "is not too adept at getting its products shipped," said Frank Michnoff, an analyst who covers networking markets at Meta Group, Inc. in Westport, Conn., it would be a mistake to conclude that management is not a priority. He added, "management for networking companies in general is a priority."

Hotel adopts AT&T server

BY JOANIE M. WEXLER
CW STAFF

BETHESDA, Md. — An AT&T Starserver E has started zipping through the work of three personal computers for Fairfield Inn's reservations system and back-office applications. The Unix-based symmetrical multiprocessing computer will allow Marriott Corp.'s economy lodging chain to expand the number of properties it supports from 75 to about 100 by the end of 1991, according to Fairfield.

Starserver, based on Intel Corp.'s I486 microprocessor technology, will link Fairfield's properties with its central reservations center in Omaha and its central accounting system here.

"We'll be able to double the number of reservation clerks and modems we can handle, which will let us communicate with greater numbers of properties," said Molly Fine, vice president of systems development at Fairfield.

Fine said the choice of a Unix-based system was important to Fairfield because all of its

Continued on page 51

ACTUAL SIZE

E-mail for UPS business only

BY ELLIS BOOKER
CW STAFF

PARAMUS, N.J. — Forget about using the electronic mail system at United Parcel Service, Inc. to advertise that you do magic at kids' parties and that your stage name is Moffo the Magnificent.

Every time UPS E-mail users log onto the in-house service, they are greeted by a short statement reminding them the system is strictly for UPS business and that UPS retains the right to monitor the content of all messages.

In light of recent publicized cases concerning corporate and public network E-mail systems and the rights of users [CW, Jan. 14], the UPS approach may be an idea whose time has come.

"I think it's a smart idea to notify people," said Walter E. Ulrich, director of Arthur D. Little, Inc. in Los Angeles. "Certainly it makes [the policy] clear."

Restricted to business

The UPS policy was established one year after the system went on-line in 1987 and was part of a companywide rewriting of employee guidelines. The E-mail rule is comparable to the one governing UPS' interoffice mail, which likewise is restricted to business use.

"It's consistent with other UPS policies," said Steven Heit, the company's information services planning manager. Heit said UPS has not assigned any employees to peruse electronic correspondence, and he added that he is unaware of any problems with the policy since it was instituted.

Because the technology is relatively new for many, E-mail users may misunderstand or not even know the corporate guidelines for its use, said Eric Arnum, editor of "Electronic Mail & Microsystems," a monthly newsletter.

Arnum said UPS is unique in putting its privacy statement on its log-on screen. UPS, like many other companies, has witnessed a massive increase in its E-mail traffic since the system was first deployed to 120 users in 1987. By the end of 1993, UPS expects to have more than 30,000 electronic mailboxes. Currently, the system handles 100,000 messages per week.

"Our intention in the next year or two is to give all managers direct access to E-mail," Heit said. In fact, Heit calculated that because of departmental mailboxes, there will be mailboxes for more than the 20,000 to 25,000 managers at UPS.

While UPS saw some cost savings from paper reduction, the real benefit of the E-mail system was how it tied together its far-flung enterprise, which includes operations in 180 countries and 7,000 operating centers in the U.S. "Because of time-zone differences, [E-mail] has become critical," Heit said.

AT&T Tridom uses VSATs

MARIETTA, Ga. — AT&T's satellite subsidiary recently entered the disaster recovery services business with a system using very small-aperture terminal (VSAT) networks. AT&T Tridom said its Host Interface Disaster Recovery Service uses VSATs interfaced to a user's host computer and can be configured on-site at the customer's data center. The service costs $375 per month.

Tridom also announced that Farm Credit Bank in Columbia, S.C., had become the first customer of the service. The bank will use the VSAT network to link 170 of its remote offices through AT&T Tridom's shared hub here.

In a recent test held in conjunction with Rosemont, Ill.-based Comdisco Disaster Recovery Services, Inc., Farm Credit Bank data traffic was redirected from Columbia to Comdisco's Atlanta recovery center over a combination of the VSAT network and terrestrial lines.

ELLIS BOOKER

Tymnet desktop packet switch debuts

BY ELLIS BOOKER
CW STAFF

SAN JOSE, Calif. — British Telcom PLC's acquisition of Tymnet, Inc. from McDonnell Douglas Corp. in November 1989 was capped last week with its introduction of a desktop communications processor.

The new PXL line marks BT Tymnet, Inc.'s final transition away from McDonnell Douglas' Computer Systems Corp. (CSC) as a manufacturer of its products. Guntersville, Ala.-based Comptronix Corp. will build the PXL. For the past 18 months, Comptronix has built BT Tymnet's two high-end communications processors, the Compact XL and Dual Compact XL, in an assembly plant in San Jose.

According to BT Tymnet hardware products manager Jeff Zanardi, the PXL — ranging in price from $7,500 to $12,000 — will be able to compete with fixed-application packet assemblers/disassemblers as well as hardware-configurable processors from Timeplex, Inc. and others.

The software-configurable PXL processor replaces the Micro 3, Micro 4 and Pico Tymnet processors. BT Tymnet said it will support the discontinued lines, which represent about 30% to 35% of its installed base. However, an upgrade policy to the compatible PXL family has not been decided, company officials said.

The base PXL, which will be available next month, comes with two network connections and can be upgraded to a 32-line node. The processor supports up to 32 asynchronous or 16 synchronous devices at 19.2K bit/sec. or eight synchronous devices at speeds of 64K bit/sec.

Network line cards, in increments of four network connections each, can be installed in the single motherboard VME chassis of the PXL. The PXL supports a variety of terminal and host protocols including X.25, asynchronous, 3270 BSC, 3270 SNA, Synchronous Data Link Control and Burroughs.

The PXL is expected to be demonstrated this week at the Communications Network '91 show in Washington, D.C.

Hotel

FROM PAGE 47

operations currently run over the Xenix operating system, a flavor of Unix from The Santa Cruz Operation and Microsoft Corp. While the Starserver runs AT&T's Unix System V — another Unix version — "Xenix and Unix System V played together OK in the benchmarks," Fine said. "We've ported over our current applications, which we designed around the Computer Lodging System, and we're passing data."

Fine added that with the installation of Starserver in the back office, the lodging chain will have "better accounting control and a more effective tool for communicating with the properties through plain power and manipulation capability."

She explained that the Starserver will run an Informix Corp. database to enhance those capabilities.

Tough competition

The Starserver was up against competing machines from IBM and NCR Corp., according to Fine. The pending hostile takeover of NCR by AT&T, she acknowledged, had not yet reared its head at the time Fairfield ran its benchmark testing.

Now, she said, "it is a matter of concern for some folks at Marriott because while there are some synergies between the two companies, there are also some differences in the way they handle support and maintenance. We also wonder which equipment will survive."

Fairfield's wide-area communications are handled by the BT Tymnet, Inc. public data network. The chain's Starserver-based reservation system is replacing a three-PC Ethernet local-area network.

Northern

FROM PAGE 47

the needs of its customers, Gonzalez said. The company's decision to sell most of its CPE, including PBXs, through the regional operating companies, had the effect of distancing it from end users, he added.

Nevertheless, Northern does have one clear success in the end-user data networking market, which is now Doss' primary responsibility: the DPN switch, whose sales reached $100 million worldwide last year, Guite said.

That represented about 20% of the worldwide packet switch market, which totaled $489 million last year, according to Vertical Systems Group, a Dedham, Mass.-based research firm.

Furthermore, as a high-end packet switch that serves both value-added network services and high-end users, DPN is collecting an impressive array of Fortune 500 customers.

Both American Airlines and United Parcel Service, Inc. decided within the past couple of years to build their worldwide networking systems on a DPN foundation. Both are in the midst of a gradual rollout of some 100 DPN nodes and report satisfaction with the packet switch's performance and Northern's service and support.

Doss' "direct responsibility" is to develop and implement a strategy to ensure that the DPN product line continues to satisfy such customers. A major element of that strategy, which extends to Northern's central-office products, is to provide users with a "switching fabric and core that will support digital voice all the way through broadband data switching both for central office and CPE," Doss said.

To this end, Northern has been aggressively implementing the latest high-speed technologies, such as Synchronous Optical Network, frame relay and broadband Integrated Services Digital Network (ISDN).

This strategy seems to sit well with large corporate users who appreciate Northern's assurance that their data networking needs will be met.

"We are certainly very interested in seeing Northern pursue technologies such as frame relay and cell switching as well as a continuing policy of ISDN compatibility," said Douglas Fields, manager of telecommunications at UPS.

"We chose DPN because it had the future directions we were looking for and because of Northern's strength as a manufacturer, installer and maintainer," Fields added.

While the sledding has been tough during the past year or two, Northern's lean and mean strategy "will serve it in the long run," Guite said. Indeed, the firm's 1990 revenue bettered its 1989 performance by 11%, setting a new record.

AT&T adds to network line

SCOTTSDALE, Ariz. — AT&T Computer Systems expanded its scope in the internetworking arena earlier this month at the Network Users Group/AT&T meeting.

Among the company's announcements was a 12-port managed multiport repeater that supports 10Base-T local-area networks — 10M bit/sec. local area networks that run over unshielded twisted-pair wiring. The $2,600 wiring concentrator is slated to ship in May and will be available with a $1,200 Simple Network Management Protocol-based network-management module.

The company also announced a token-ring interface, available now, and a frame-relay interface, scheduled to be available in April, for its Starwan family of bridge/routers.

The frame-relay interface — aimed at equipping users with next-generation "fast" packet-switching transmission technology — reportedly conforms to a set of specifications made public in September by Digital Equipment Corp., Cisco Systems, Inc. and Northern Telecom, Inc., to which several other vendors have pledged conformance.

JOANIE M. WEXLER

MANAGER'S JOURNAL

EXECUTIVE TRACK

Richard G. S. Robinson has been promoted to vice president of management information systems at **Live Home Video, Inc.** in Van Nuys, Calif., which is a subsidiary of Live Entertainment, Inc.

In his new position, Robinson oversees all operational and financial computer systems and office services. He reports directly to David Mount, president and chief executive officer.

Before the promotion, Robinson was the company's director of MIS. He joined Live Home Video in 1989 after a stint as an independent consultant.

He was the director of MIS at Symbolics, Inc. until 1989.

.....

Michael A. Studney has been named director of MIS for the automotive, specialty products and marine divisions of **Castrol, Inc.** in Wayne, N.J.

Studney was most recently director of technology planning at the Schering Laboratories division of Schering-Plough, Inc., where he had been employed for 15 years.

Studney's positions at Schering-Plough included acting vice president of MIS, director of information services, director of information processing facilities, manager of support services and manager of technical services.

Before joining Schering-Plough in 1975, Studney spent six years in IS positions at Western Electric Co. He holds a bachelor's degree from Youngstown State University in Ohio.

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Who's on the go?

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Emergency care gets a shot in the arm

Hospitals are using technology to improve response in critical situations

BY CHRISTINE CASATELLI
SPECIAL TO CW

Heidi Stevens

Emergency health care is one service that many people cannot live without. Yet most hospital emergency departments have traditionally operated in the red.

Why? Because they are often unable to track costs during urgent care, and they have a mandate to treat all patients who pass through their doors regardless of their ability to pay the bill. In 1989, nearly 90 million patients throughout the country went to hospital emergency departments.

To remedy the situation, budget-conscious emergency departments are turning to technology to help them operate as efficiently as possible and keep expenditures down. Staff shortages, fixed-scale reimbursement and competition from alternative health-care providers for quality medical personnel and paging business are also forcing hospitals to rejuvenate the efficiency of their emergency departments.

"The focus has changed to managing hospitals more as businesses," says Ijaz Bokhari, director of management engineering at Alexandria Hospital in Alexandria, Va.

Emergency departments, for their part, can play an integral role in that business. They have the potential to generate as much as 40% of a hospital's revenue in inpatient referrals, says Keith L. Goding, vice president at Spectrum Emergency Care, a St. Louis provider of emergency physician and management contract services.

However, finding the information systems that emergency departments need is no easy task because of the nature of the emergency room — erratic work flow and fast turnaround of patients. Most off-the-shelf packages targeting emergency patient tracking, documentation and staffing are still in test phases. So, many hospitals have found themselves acting as test sites or developing their own systems to get what they need.

Focus on patients

With more than 160 emergency patients to care for each day, St. Elizabeth Hospital in Beaumont, Texas, needed to help staff members spend more time on people and less time on paperwork, says Dr. Charles Owen, the physician director of the emergency department at St. Elizabeth.

For four years, the hospital has been

Continued on page 54

Insurance firm comes home to better systems

BY CLINTON WILDER
CW STAFF

The challenge of making information technology a strategic resource is one thing, but when Thomas Gaughan arrived at The Home Insurance Cos. in New York 13 months ago, he faced a more urgent need. The company's systems were running out of gas.

Gaughan *focuses on strategic IS at Home Insurance*

Gaughan quickly began working to solve that problem, replacing an IBM 3084 mainframe with a 3090 Model 400E, installing 15 Application System/400s in Home's branch offices to displace System/36s and bringing in seven Novell, Inc. local-area networks to link disparate personal computers. "That was the immediate priority," Gaughan said.

Gaughan, Home's senior vice president and chief information officer, can now concentrate on more strategic information systems initiatives that began last year. That is a big challenge for the veteran executive, who spent most of the 1980s heading IS at Primerica Corp. and its previous incarnation, American Can Co.

"Like many insurance companies, [Home] had many embedded systems from the 1970s and early 1980s," Gaughan said. "We were information-rich and access-poor. There hasn't been an integrated approach linking the process flows to a strategy. It has just been passing information back and forth."

The cornerstone of Gaughan's strategy to help re-engineer Home's $2.5 billion property and casualty insurance business is the development of a LAN-based "claims workstation." The project's goal is to give professionals in the firm's 30 branches throughout the U.S. access to data residing in all three tiers of the information architecture and to automate many of the functions currently done manually.

The system's business goals are to reduce paperwork, improve customer service and increase productivity in the branch offices. Using a natural language front end, branch officers will be able to access Home's core IMS-based claims database and information residing on the branch AS/400 and LAN.

"Our objective is to really exploit the connectivity," Gaughan said.

The firm developed a demonstration prototype workstation last year and has plans for a full-production prototype this year and fully operational workstations in all of the company's branch offices by 1992.

Emergency

CONTINUED FROM PAGE 53

a test site for Clinical Resource Systems Inc.'s Emstat, an emergency department clinical information and patient tracking system that records data at networked workstations as patients move through different phases of their treatment. It runs on Hewlett-Packard Co. Series 9000 computers using touch screens.

"We're anticipating a return on investment within 18 to 24 months," Owen says. The greatest return of all, however, has been that emergency patients spend only an average of 25 to 30 minutes in the department.

Fast and friendly

Quick, caring service is also important at Cedars-Sinai Medical Center in Los Angeles. Cedars-Sinai uses an on-line interactive information system to admit emergency patients swiftly so treatment can begin at once, says Ash Dave, vice president of information systems and chief information officer at Cedars-Sinai.

The Cedars-Sinai emergency department system was developed in-house as part of the hospital's integrated IBM and Digital Equipment Corp.-based information system. The system, whose interface is a light pen, also contains indexes on poisons, drugs and procedures on-line for instant answers to life-threatening questions. The emergency room component can tap the hospital's administrative database, so staff members have access to 750,000 patient records.

The information system also keeps track of the bottom line for the busy emergency staff. When a test is ordered, the system automatically generates a charge and computes the bill. Dave estimates that as a result of this compatibility, the hospital is recouping roughly 10% more on expenditures than in the past.

Such bottom-line benefits are important in terms of investment justifications. "It's increasing difficult to justify the cost [of return] of emergency department information systems," says Frank Cavanaugh, national director for health care information systems at Coopers & Lybrand in Chicago. The challenge for IS chiefs is to combine quality of patient care with income enhancements.

One way hospitals are tying together patient care and economics is by zeroing in on illegible, incomplete and erroneous paperwork. By improving this, emergency departments can make quantifiable gains in patient care and profits, emergency room managers say. Goding estimates that hospital collection rates of only 50% are not uncommon.

"For reimbursement purposes, for legal purposes, for accreditation purposes, the documentation in the emergency room is becoming more critical," says Larry Pawola, vice president at Sheldon I. Dorenfest & Associates, a health care IS consulting firm in Chicago.

Documentation, which generally takes the form of requisition slips, hospital forms and staff notes, is now being replaced with electronic files that can be transferred among departments.

The emergency care staff at Lakeview Hospital, a 200-bed health care facility in Bountiful, Utah, was feeling the weight of growing documentation requirements.

In 1989, Lakeview, which sees 20,000 emergency patients yearly, became a test site for Dictaform software developed by Dr. Robert Rothfeder and Dr. Dennis Wyman, Lakeview emergency physicians.

Rothfeder describes Dictaform as a word processing program that prompts doctors with a series of categories to help them document a patient visit. Each category must be completed using a keyboard before the user can move to the next screen, which makes the medical report more thorough and legible.

Dictaform runs on one Intel Corp. 80386- and one I486-based IBM Personal Computer. Because the software can log more data on treatment and tests, Lakeview has been able to recover more reimbursable charges and has noted a 21% increase in gross emergency room revenue during the six months of its operation, Rothfeder says.

Increasingly, legal liability is as much of an issue as profitability. Illegible or incomplete reports can be a problem if hospitals are hit with malpractice suits.

Dr. Robert Rosen, director of emergency medicine at Riverview Medical Center in Red Bank, N.J., opted for a voice-activated medical reporting system called Voice Em. The system allows physicians to dictate trigger phrases into a telephone handset to generate emergency department patient records.

On order

If IS managers at hospitals could get the perfect emergency department system, here is what they say they would want:

- More emergency-department-specific systems.
- Integrated inpatient and outpatient files.
- User-friendly interface for doctors and nurses — either a mouse, light pen, touch screen or bar-code interface.
- Expert system with a built-in decision tree to help emergency department staff with diagnosis.
- Bedside terminals.
- Hospitalwide computer network connectivity.

Developed by Kurzweil Applied Intelligence, Inc. in Waltham, Mass., Voice Em uses voice recognition technology to skip traditional tape transcription and prepare clean reports faster. Voice Em's knowledge base contains more than 100 common words and phrases specific to emergency medicine. Physicians recite key words such as "chest pain" to activate the voice-to-text technology.

Riverview, whose emergency room deals with 35,000 patients annually, spent roughly $50,000 for the two stand-alone Voice Em desktop systems it put in place in 1989. Each package runs on a stand-alone HP Vectra 386 personal computer.

Because the voice system helped 492-bed Riverview avoid hiring two transcribers — at approximately $25,000 each per year — Rosen estimates the system's return on investment to be less than one year. Also, "if it prevents one lawsuit, then it more than pays for itself," he says.

In fact, says the American College of Emergency Physicians' Massachusetts chapter, a doctor using voice-activated systems in one of the state's emergency rooms may save $2,400 in annual malpractice premiums.

Staff troubles

To provide the kind of care that emergency departments demand, IS managers have begun the search for systems to help personnel who are stretched to their limits because of staff shortages.

That's why Alexandria Hospital is looking to implement an emergency system soon.

Despite hefty costs associated with putting in an emergency room system — projected to be as much as $300,000 — Bokhari estimates that the system will pay for itself in one year in recovered charges and staff costs. According to a 1990 study by the hospital, it would take staffers one-third the time to review an electronic patient chart than it would to review a written one because the former would be more complete and legible. Furthermore, the study found, automation would save eight hours of nursing time each day, which translates to one full-time nurse earning $50,000 per year.

St. Elizabeth Hospital's *emergency staff can track patient progress with touch screens*

By matching the number of staff members to the predicted work load, emergency departments can also determine staffing needs with more accuracy. For two years, administrators at Northwest Hospital in Seattle have been using a decision-support tool called Emerge to match staffing levels with patient populations in its emergency department. A product of Medicus Systems Corp. in Evanston, Ill., Emerge runs on an IBM mainframe or PCs.

"The system can tell you what the case mix is, and it's able to determine at what time of day the most severe cases appear," says Edie Gamble, head nurse manager at Northwest. "By mixing up the hours, you make sure you have the most staff on when you're the busiest," she says.

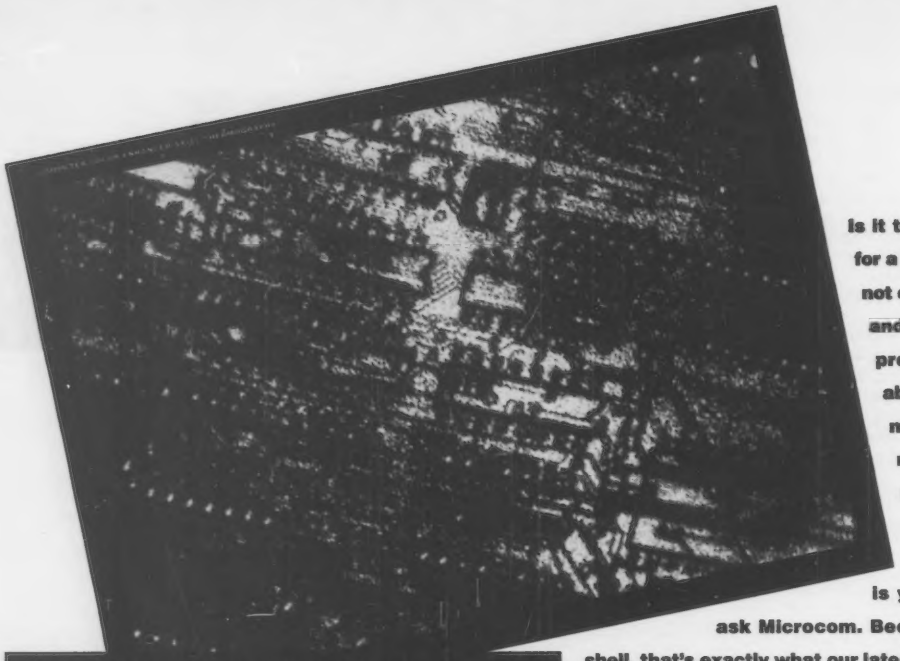
Northwest is gearing up to use Emerge to charge according to patient type and the amount of nursing time required. In the weighted scale, a patient with a sprained ankle would be billed less than another patient who had a severe laceration because the former would take less time to treat.

Casatelli is a free-lance writer based in Washington, D.C.

Help, stat!

The following trends are driving the need for emergency department automation, according to Keith Goding, vice president of Spectrum Emergency Care, a contract emergency department personnel company:

- **Volume of visits per year is rising.** Numbers have risen from 83 million in 1981 to slightly less than 90 million in 1989.
- **Increase in acuity.** Emergency departments are seeing more acquired immune deficiency syndrome, drug and violent crime cases in high-volume urban areas.
- **Poor collection rates.** Although each hospital is different, it is not unusual to find some institutions with collection rates of 50% or less.
- **Getting the most out of emergency rooms.** Emergency rooms can contribute nearly 40% of revenue because many emergency room outpatients eventually become hospital inpatients. Faster, more personalized service bolsters the hospital's reputation, attracting patients and quality staff.



SOME INSIGHT INTO THE NEW MICROCOM LAN BRIDGE PRODUCTS

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SHOULDN'T YOU BE COMMUNICATING WITH MICROCOM?™

NETWORK CONNECTORS

Don't let standards tangle traffic patterns

BY ERIC ANDREWS

Rotaries, five-corner traffic lights and one-way streets can be easily negotiated — once you know and can follow their rules. In order to avoid snarled traffic on local-area networks interconnected with bridges and routers, it is just as crucial for you to understand the various standards and protocols to which these devices adhere.

Internetworking devices today combine bridging and routing functionality (see story page 59). To keep the purchase issues simple, it is best to focus not on the label but on the functionality of the device, including how it supports multiple protocols and imcompatible bridging and routing standards and how it provides integrated network management.

The biggest distinction between bridges and routers is that bridging devices can connect LANs regardless of which upper-layer protocol the LAN supports, be it Novell, Inc.'s Netware or Transmission Control Protocol/Internet Protocol (TCP/IP).

Routing devices, on the other hand, support these upper-layer protocols and connect only LANs of similar protocols.

To address this limitation, many routers have added support for a variety of protocols, terming their products "multiprotocol routers." Some vendors have added bridging capabilities for those protocols that are not supported. While supporting user protocols is important, issues that often evade users are the incompatible internal protocols used by bridges and routers.

In connecting any LANs, bridges and routers need to talk to each other to ensure they can deliver packets to their proper destination. Standards have developed for this "internal" communication; unfortunately, they are incompatible.

Mark Fisher

For bridges, the prevalent standards are Spanning Tree and source routing. Spanning Tree, which is incorporated into the Institute of Electrical and Electronics Engineers, Inc.'s (IEEE) Transparent Bridging standard, is used in most Ethernet environments, while source routing is an IBM strategy used primarily in Token-Ring environments. With source routing, the originating node participates in finding the path to the eventual destination, whereas Spanning Tree puts that burden on the bridge.

Although IBM nodes will probably never communicate with non-IBM nodes, these incompatible standards prevent even the use of a common LAN internetwork to simultaneously support both environments. This is primarily an issue in token-ring environments supporting IBM and non-IBM devices and also in bridging Ethernet and token-ring environments. Many token-ring bridge vendors have begun supporting Spanning Tree, including Vitalink Communications Corp. and Crosscomm Corp.

Andrew Corp. and IBM bridges, on the other hand, have chosen to stick with source routing. Token-ring bridge vendor Halley Systems, Inc. uses a proprietary source-routing encapsulation technique for nonsource-routed traffic, thereby supporting both environments.

These approaches may soon be made obsolete by a bridging method under review by the IEEE — Source Routing Transparent (SRT), which will allow bridges to forward both source-routing and Spanning Tree bridging frames.

While the standard is about six months from being approved, Crosscomm has already released a token-ring bridge based on this standard, and most token-ring bridge vendors intend to support it.

Beware the expense

There are some caveats surrounding SRT, however. While upgrading Spanning Tree bridges to SRT will be a simple software upgrade, upgrading source-routing bridges will involve hardware upgrades as well, costing $1,000 to $2,000 per bridge. Furthermore, SRT bridges will not interoperate with older source-routing bridges.

SRT is only a partial solution, however, for bridging Ethernet to token-ring. In addition to handling source routing and Spanning Tree, bridging devices must also convert between different frame formats.

Products that address this issue include IBM's 8209 bridge, Ungermann-Bass, Inc.'s Net Access and Crosscomm's ILAN-H. While these products currently use proprietary algorithms, they need to support SRT to become truly useful in a mixed environment.

As in the bridging world, routers need to communicate with each other via standard protocols that play a critical role in

Continued on page 58

Andrews is a manager at the Network Strategies practice of Ernst & Young in Vienna, Va.

INSIDE

Blurry Vision
Bridge, router similarities extend into price, performance. Page 59.

Buyers' Scorecard
Users choose Attachmate as favorite SNA gateway. Page 62.

Product Guide
A comprehensive list of electronic-mail gateways. Page 65.

Continued from page 57
the overall performance, bandwidth efficiency and network control capabilities of the router.

The current industry standard is the TCP/IP's Routing Information Protocol (RIP). Because of limitations in RIP, however, vendors such as Cisco Systems, Inc. have developed their own versions of this protocol.

Link-state protocols on the way

An exciting new breed of standards is arriving, however, that significantly improves performance and efficiency: TCP/IP's Open Shortest Path First (OSPF), Open Systems Interconnect's (OSI) IS-IS and Digital Equipment Corp.'s Integrated IS-IS.

These three protocols — called "link-state protocols" — use a more sophisticated algorithm than RIP and IGRP, which are "distance-vector protocols."

The link-state protocols require significantly less overhead because they require less routing information to be transmitted less frequently between routers. They also enable networks to converge much faster, reducing the time it takes for all the routers in a network to dynamically adapt to network configuration changes. (Such delays can lead to randomly lost packets.) The newer breed has also added network control features.

It has yet to be determined how these new protocols will position themselves in the marketplace. OSI's IS-IS is the fledgling international standard, but a significant installed base of routers need to support TCP/IP.

DEC's protocol is a version of OSI's IS-IS that incorporates support for TCP/IP, whereas OSPF is designed specifically for TCP/IP.

Most router vendors have announced support for OSPF and IS-IS, whereas support for Integrated IS-IS is limited to DEC and Wellfleet Communications, Inc.

Most router and smart-hub vendors, as well as some bridge vendors, have rallied around the latest standard for network management: TCP/IP's Simple Network Management Protocol (SNMP). This standard allows a single network management control station to manage a campuswide or enterprisewide LAN internetwork architecture.

Users have to be careful, however, when purchasing "SNMP-compliant" products. It is easy to claim SNMP compliance, but to be useful, vendors must incorporate proprietary characteristics of the interconnect devices. These characteristics are handled by proprietary Management Information Base (MIB) extensions. Purchasers need to ensure that the SNMP workstation they are considering supports the standard as well as proprietary MIB items for all of their SNMP bridges, routers and wiring hubs.

The benefits of LAN internetworking are plentiful. Properly built, they can provide users with access to and management of a broad range of computing resources from a single workstation or personal computer. It is not so easy, however, to select the necessary equipment and then configure and manage it.

Certainly, you can't depend on the traditional definitions of bridge and router. Instead, users must define and weigh functional requirements for protocol support as well as standards compliance and network manageability. •

BRIDGES & ROUTERS

Solving issues on remote links

When it comes to connecting local-area networks over remote links, a new set of issues appears. Because remote links are typically slower, more expensive and less reliable than LANs, the bridging or routing protocol must be extremely bandwidth-efficient and robust.

Newer router protocols were designed to accommodate the characteristics of remote links, allowing load sharing across redundant links and limiting overhead. However, bridging protocols are not. Consequently, remote bridges — offered by Cryptall Communications Corp., Halley Systems, Inc., Microcom, Inc., RAD Data Communications, Inc., 3Com Corp. and Vitalink Communications Corp. — are different than local bridges.

These typically come in pairs and are used to connect two LANs over a point-to-point circuit. While they maintain the appropriate bridging protocol on the LAN interface, they use proprietary protocols over the wide-area network link.

These proprietary protocols add features such as load sharing across redundant links, intelligent routing of the Open Systems Interconnect Data Link Layer address, data compression, multiplexing, alternate routing and autodial backup.

It is unlikely that these proprietary protocols between bridges will be standardized, although the Institute of Electrical and Electronics Engineers, Inc. is looking into standardizing communications between clusters of remote bridges from different vendors.

Another protocol intended for remote LAN linkage is frame relay, which packetizes data more efficiently over a WAN [CW, Dec 3]. Advanced Computer Communications, Inc., Cisco Systems, Inc., Digital Equipment Corp., Proteon, Inc., RAD, 3Com, Vitalink and Wellfleet Communications, Inc. have announced support for the standard. •

ERIC ANDREWS

Is it a bridge or a router? Increasingly, it's both

The bridge/router duo has officially extended its membership, as witnessed by the many combinations bearing a resemblance to the original names.

The essential differences among the available products include the following:

- **Bridges** work at the Data Link Layer of the Open Systems Interconnect model to pass data to another local-area network. They are best used on a small number of LANs with limited complexity.
- **Brouters** are bridges that offer intelligent routing based on the Data Link Layer address.
- **Routers** work at the next level — the Network Layer — to address and forward packets of data.
- **Hybrid bridge/routers** bridge unsupported protocols, making them appear as "protocol-transparent" as the simpler devices. Advanced Computer Communications, Inc., Cisco Systems, Inc. and Wellfleet Communications, Inc. offer this feature on their routers.
- **Multiprotocol routers** route several protocols at the Network Layer. Most vendors are moving to announce these products.

The overlap between bridges and routers extends into price and performance. While routers are considered slower than bridges, improvements in hardware architecture have enabled them to achieve performance comparable to bridges.

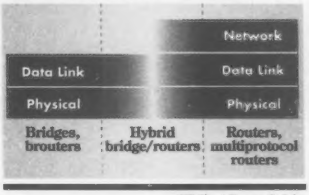
Performance for both devices is measured by filtering and forwarding rates measured in packets per second. These rates are only meaningful if you know the packet size used for the measurement — in fact, that is one of the ways vendors skew their performance specifications.

Because of price slashing, routers have started to compete in price with high-end bridges. In addition to knowing the sticker price on both devices, however, be sure to understand the configuration you will require — number of cards and adapters, network management costs and the indirect costs of efficiency over expensive wide-area network links. •

ERIC ANDREWS

Throw out the rulebook

Vendors have added routing functionality to bridges and vice-versa, blurring traditional definitions, based on the OSI model



CW Chart: Doreen St. John

In progress

Vendors are responding in a number of ways to user requests for faster and more reliable connections between local-area networks as well as communications between incompatible network platforms.

- **Switched Multimegabit Data Service (SMDS).** SMDS allows private network users to communicate over public packet-switched lines. Most major manufacturers are considering SMDS support, although Advanced Computer Communications, Inc. is one of the few to announce such support on its Series 4000 bridges/routers.
- **PU2.1.** This IBM protocol will allow devices such as Application System/400s already connected on a Systems Network Architecture (SNA) backbone to communicate directly with each other without going through the SNA host.

While PU2.1 is the topic of much discussion among bridge and router vendors, none have made concrete announcements of delivery dates for supporting the protocol.

Cisco Systems, Inc. plans to add a software feature called Synchronous Data Link Control Transport to all of its routers in mid-1991. Proteon, Inc. will offer a similar feature on its Pronet CNX 500 router.

- **Communications functionality.** Vendors point to an overall industry trend of integrating as many hardware functions as possible into internetworking products.

For example, Network Equipment Technologies, Inc. plans a Communications Network '91 demonstration of a bridge/router that will be included within a T1 multiplexer, yielding a "hybrid multiplexer" able to perform circuit- and packet-switching functions, depending on the software inserted.

Cisco has announced the addition of Layer Seven protocol translation to its low-end IGS router. Advanced Computer Communications is considering integrating modems into bridges and routers.

DEREK SLATER

Slater is a *Computerworld* staff member.

Gateways aren't the only way to get PCs and hosts talking

BY SIDHU BANARJEE

Bridges and routers are fine for getting data to the right place across diverse local-area networks. But for personal computers on the LAN to share data in a meaningful way with other PCs, servers or hosts on another network, you need to consider two alternatives: gateways or a native-mode interoperability strategy.

Banarjee is a manager at the Network Strategies practice of Ernst & Young in Vienna, Va.

Gateways serve as interpreters between incompatible devices. The basic strategy requires terminal or workstation emulation software to reside on the PC. The emulation data is formatted by gateway software into a host network and session-level protocol and then encapsulated into packets for transmission over the LAN.

At the gateway device, the host data is separated and further formatted, and the resultant host-protocol traffic is transmitted to the host.

A native-mode strategy alleviates the need for encapsulation. Instead, it allows the machines to agree on a set of protocols and application interfaces supported directly on the LAN.

At first glance, gateways provide a lower level of service and functionality, but the benefit of gateways is that they provide a straightforward means of PC-to-host connectivity without major revisions to host or PC software.

Furthermore, application functionality is not affected by the gateway. Host security is also increased because users must pass through both LAN and host security measures before gaining access.

However, these devices are infamous for causing bottlenecks. Performance problems can be alleviated by choosing a gateway that works on a high-performance server rather than on a PC.

Other performance factors must be addressed when implementing gateways. Gateway buffer sizes should be set according to network speeds to avoid performance degradation. Timing parameters should be set according to the network environment to avoid excessive retransmits or retransmit time-outs.

Network management, while never simple, can be twice as difficult with gateways. They do not adequately support either LAN management systems or host management systems.

Another problem with gateways is interoperability. Gateway software in the PC and the gateway device are vendor-specific and cannot be mixed and matched.

GATEWAYS

While Transmission Control Protocol/Internet Protocol (TCP/IP) emulation packages recognize most common TCP/IP applications, not all packages support the same implementations.

Native-mode strategies such as Novell, Inc.'s LAN Workplace for DOS or OS/2, 3Com Corp.'s Demand Protocol Architecture and products from IBM and Attachmate Corp. hold some appeal over gateways.

These solutions augment LAN operating system protocols and traditional host protocols such as Systems Network Architecture or TCP/IP, and they provide feature-rich protocols and applications interfaces for PC and host connectivity.

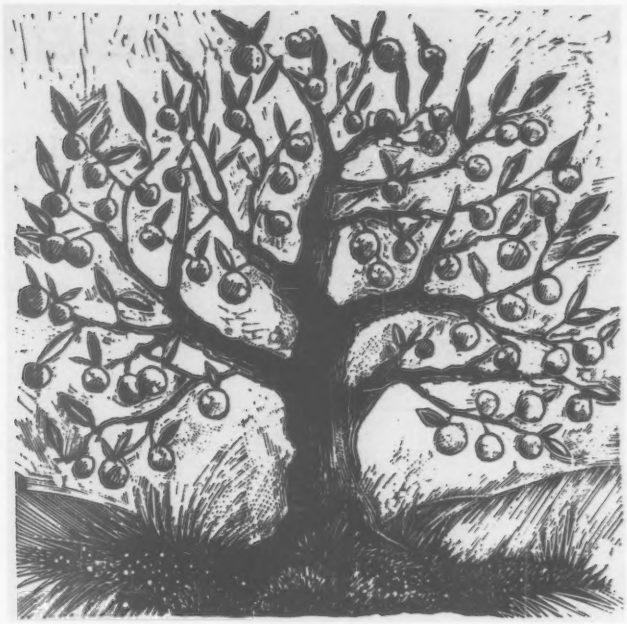
This alternative is not without a price, however, both in cash and system resources. IBM versions require controllers and front-end processors, which are more expensive than PC gateways. Also, software for native-mode protocol drivers requires additional PC memory.

There is an availability problem as well. Only a handful of software products provide direct TCP/IP PC-to-host connectivity and full coexistence with other LAN protocols. Over time, more of these will become available, however, and native-mode strategies address many gateway limitations, including the following:

- **Increased throughput.** There is no need for encapsulation or analysis of LAN packets, so speed is increased.
- **IBM LU6.2 PC connectivity.** This protocol provides a platform for distributed processing and emerging client/server applications. IBM Personal Computer-platform gateways do not generally support LU6.2 connectivity.
- **Network management.** Because bridges and routers can replace gateways in a native-mode strategy, greater integration with host resources and management systems can be achieved.

As with gateway devices, device tuning and performance parameter setting can require effort. This task is made easier, however, with the increased control and management functions available with routers and bridges.

The decision to connect LAN-based PCs with a host computer via gateways or a native-mode solution depends on a number of factors, including how much money you have to spend, the size of your network, network management needs, performance requirements, existing equipment and product availability. •



HOW OTHERS SEE THE MACINTOSH-TO-MAINFRAME CONNECTION.

HOW AVATAR SEES IT.

When it comes to system integration, you don't have to treat the Mac differently than any other device on your network. Introducing the MacMainFrame Series, the broadest range of Macintosh-to-mainframe connectivity options available.

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BUYERS' SCORECARD

Extra! tops LAN SNA gateway ratings

LAN Gateways to SNA

Scores reflect all criteria and their user-assigned importance
Response base: 50 per product set, except Irmalan (37)

Product	Three highest ratings	Three lowest ratings
Attachmate's Extra! SCORE 57	User configuration options Terminal and printer emulation Protocol compatibility	Network management capability Cost per workstation Efficient use of memory
Digital Communications Associates' Irmalan SCORE 56	Reliability Ease of use Terminal and printer emulation	Network management capability Efficient use of memory Gateway configuration options
Novell's Netware SNA Gateway SCORE 55	Ease of use Reasonable line speed Reliability	Efficient use of memory Network management capability Service and support
IBM's Personal Communications 3270 & OS/2 Extended Edition SCORE 53	Reliability Reasonable line speed Protocol compatibility	Cost per workstation Network management capability Efficient use of memory

BY MICHAEL L. SULLIVAN-TRAINOR
CW STAFF

The latest technology isn't everything. That's what buyers of local-area network gateways seem to be saying in *Computerworld*'s Buyers' Scorecard on LAN Systems Network Architecture (SNA) gateways. The 187 gateway users surveyed did not rate the products with the most advanced features highest. Instead, Attachmate Corp.'s Extra! — which does not support hot options such as LU6.2 — received the highest score.

Extra! came out on top in a close race, scoring 57 points — only one more than Digital Communications Associates, Inc.'s (DCA) Irmalan and two more than Novell, Inc.'s Netware SNA Gateway. Trailing the top three products was IBM's Personal Communications 3270 for DOS and OS/2 Extended Edition, with a combined score of 53.

The scores are based on totals from 50 users of each product, except for DCA's Irmalan, which had 37 respondents. IBM product ratings are based on responses from 39 users of PC 3270 and 11 users of OS/2 Extended Edition gateway features. Respondents were asked to rate only the products they use. Final scores were calculated by multiplying the individual product group ratings by the importance ratings that all 187 users assigned to all criteria. Only gateway products that link LANs to IBM's SNA were covered (see methodology page 63).

Bellevue, Wash.-based Attachmate is known for its full-featured 3270 products. User ratings bear out this perception by giving Extra! top scores in seven of the 13 criteria, including scores of eight or better (based on a scale of one to 10, where 10 is excellent) in a list of significant gateway features: ease of use, response time, service and support, terminal and printer emulation, protocol compatibility and user configuration options.

Extra!'s weaknesses were also revealed in the lowest rating for network management capability (6.1) and second lowest in cost per workstation (6.3).

Scoring second highest among the four products was DCA's Irmalan, which has been in use for several years at many DOS-based gateway installations. Irmalan topped the cost per workstation and ease of installation categories with scores of 7.7. The product also received the second highest ratings in key areas such as reliability (8.2) and emulation (7.9).

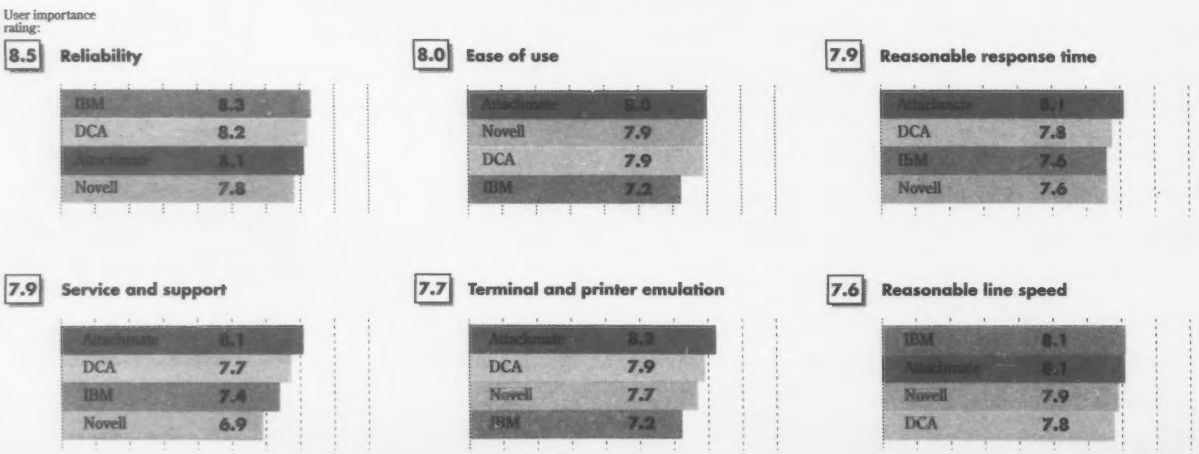
LAN leader Novell provides an SNA gateway capability for its Netware network operating systems customers. Users gave the product the third best score (55) and rated it highest in network management capability (6.4). The Netware SNA Gateway also finished second in ease of use and cost per workstation. However, users placed the product last in reliability and protocol compatibility.

The owner of the SNA side of the network, IBM finished last (53) with its pair of gateway products, OS/2 Extended Edition and PC 3270, but not without topping the most critical category for users, reliability, with an 8.3 rating. However, seven last-place finishes reveal weaknesses in areas such as cost per workstation (5.6, the lowest rating for any category), ease of use and terminal and printer emulation. •

KEY RATINGS

IBM's products receive the highest rating in the category most important to gateway users – reliability. Attachmate's Extra! places third in that category but tops the four categories that follow in terms of user-assigned importance

User importance rating:



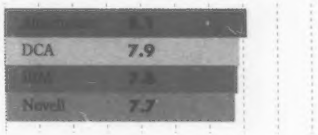
CW Charts: Paul Mock

A CLOSER LOOK

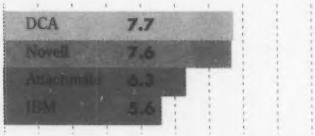
In the remaining ratings, Novell, Inc.'s Netware SNA Gateway receives the highest rating for network management capabilitity. DCA tops two categories – cost per workstation and ease of installation. Attachmate again achieves the top score in four categories – protocol compatibility, efficient use of random-access memory, gateway and user configuration options. IBM's PC 3270 and OS/2 Extended score lowest in all remaining categories, except third-place ratings in protocol compatibility and network management.

User importance rating:

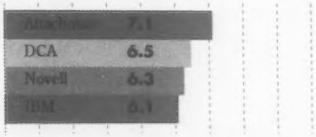
7.6 Protocol compatibility



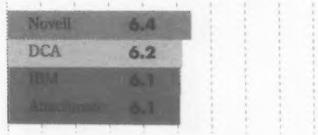
7.3 Cost per workstation



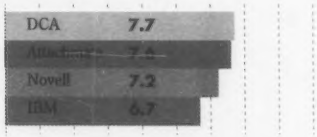
7.2 Efficient use of RAM



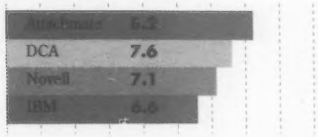
7.1 Network management capability



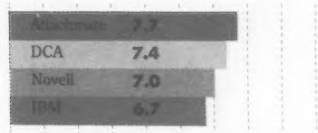
6.9 Ease of installation



6.7 User configuration options



6.6 Gateway configuration options



Loyalties

How likely would you be to purchase this product again if you were making the decision today?

(Reasons based on most frequently stated responses)

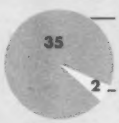
Attachmate's Extra! — Response base: 50

Number of respondents

Likely
The reason: It works/service and support

Unlikely
The reason: Incompatibility with other network operating systems

DCA's Irmalan — Response base: 37



Number of respondents

Likely
The reason: Works well/ reliability

Unlikely
The reason: Not very responsive

Novell's Netware SNA Gateway — Response base: 48

Number of respondents

Likely
The reason: Works well/ meets needs

Unlikely
The reason: Service/support from Novell

IBM's PC 3270 & OS/2 Extended — Response base: 50

Number of respondents

Likely
The reason: Works well/ meets needs

Unlikely
The reason: Not as flexible as others

Verbatim

What do you like best/least about this product?

(Responses are based on the most frequently stated answers)

Attachmate's Extra!

Likes
Ease of use
Excellent memory management
Compatibility

Dislikes
Price per workstation
Too technically-oriented
Memory consumption

DCA's Irmalan

Likes
Ease of use
Compatibility
Service and support

Dislikes
Memory consumption
Printer support
Installation difficult

Novell's Netware SNA Gateway

Likes
Price
Service and support
Compatibility

Dislikes
Service and support
Memory consumption
Documentation

IBM's PC 3270 & OS/2 Extended

Likes
Compatibility
Reliability
Service and support

Dislikes
Heavy use of resources
Inflexibility
Cost

Vital statistics

Total number of respondents: 187

How long have you been using this product?

One year or less	77
Two to three years	86
Four to five years	20
More than five years	4

What is your position?

LAN manager	75
Data communications manager	51
IS manager	59
No response	2

How do you use this gateway?

(Response base: 186)

On each workstation as a stand-alone	22
Several workstations on a LAN	125
Both	39

METHODOLOGY

Products rated in *Computerworld*'s Buyers' Scorecard on Systems Network Architecture gateways for local-area networks were selected on the basis of an installed base among Fortune 1,000 companies and sales during the last three years as measured by International Data Corp. in Framingham, Mass.

Ratings were obtained from 50 users of each product, except for Digital Communications Associates, Inc.'s (DCA) Irmalan. In that instance, the response base was reduced to 37 because of a lack of available installations. The respondents were drawn from random samples of gateway users provided mostly by nonvendor sources. The exceptions were Attachmate Corp.'s Extra! and DCA's Irmalan, where random lists of users provided by the vendors produced less than half of the respondents.

The survey was conducted by First Market Research Corp. in Austin, Texas, an independent telephone research firm. Results were tabulated with the assistance of IDG Research Corp. in Framingham, Mass.

Total weighted scores were computed by multiplying the mean scores users assigned to the importance of each criterion by the mean scores each user group gave its own products. Ratings are presented in order of importance to all users.

RESPONDENT PROFILE

Most of the 187 respondents currently use DOS-based gateways, and 46% of them plan to stick with DOS. Eighteen percent said they plan to move to OS/2 within a year, another 8% plan to move within two years, and 10% plan to switch to OS/2 within more than two years.

The respondents currently use the following LANs: token-ring only — 62%; Ethernet only — 20%; both token-ring and Ethernet — 10%; other — 12%.

Eighty-seven percent of the respondents access a mainframe over their SNA gateways, and 26% access a minicomputer.

ACKNOWLEDGEMENTS

Computerworld would like to acknowledge the assistance provided by the following individuals and companies: Bruce Coughran, Computer Intelligence; Datapro Research Corp.; Installed Technology International; David Passmore, Ernst & Young; Lucinda Santisario, International Data Corp.; and Kevin Tolly, Virtual Systems.

"Our man in Geneva can now get vital information right to the desks of our traders on four continents. In seconds."

"Only BANYAN could have done it."

From an interview with Eric Dickstein of Continental Grain.

"The ability to get information to the right person at the right time—all the time—is critical to our business. For us, Banyan's VINES® is a strategic component of our information network."

How big is your network?

"We have over 700 users worldwide on our network, with 24 servers in New York alone. 4 each in Chicago and Geneva. Plus single servers in another 12 offices. Recently we added Zaire, and we've discussed putting them in Hong Kong, Singapore, and South America."

Do you use third-party lines?

"Yes, depending on needs and economics. Mostly, it's GEIS, plus some point-to-point lease lines and dial-up facilities. Even a dedicated 56KB satellite link. And it's all totally transparent."

Why did you select VINES?

"When we started this network 5 or 6 years ago, Banyan was the only company that could satisfy our needs. Today, in my opinion, it still is."

Banyan's VINES is the only network operating system that can effortlessly grow as your company does—even on a global basis. For a further description of Continental Grain's networking challenges and solutions, write or call us at 800-828-2404 (in MA 508-836-2828).

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Electronic mail gateways

VENDOR	PRODUCT	HARDWARE PLATFORM	OPERATING SYSTEMS SUPPORTED	RAM REQUIRED (BYTES)	SYSTEMS FOR WHICH TRANSLATION IS PROVIDED[1]	E-MAIL STANDARD[2]	SOURCES FOR FILE ATTACHMENTS	SPECIAL CHARACTERS TRANSLATED	PREPROGRAMMED MESSAGES	ADMINISTRATIVE FEATURES[3]	OTHER FUNCTIONS	NETWORK OPERATING SYSTEMS SUPPORTED	TRIAL PERIOD	PRICE	MAINTENANCE FEE[4]
Alisa Systems, Inc. (818) 792-9474	Mailmate/MM	Apple Macintosh Plus and higher	Macintosh OS 6.0.2 and higher	2M	From Microsoft Mail to DEC VMSmail, All-In-1, ISSnet Mail	Proprietary	None	Tabs, DEC multinational characters	Yes	Finds cause of failed transmission	None	Appletalk, Decnet	30 days	$450 - $4,950	$425 for phone support
	Mailmate/QM, IB	Apple Macintosh Plus and higher	Macintosh OS 6.0.2 and higher	2M	From Quick Mail or Inbox Plus to DEC VMSmail, All-In-1, ISSnet Mail	Proprietary	None	Tabs, DEC multinational characters	Yes	See above	None	Appletalk, Decnet	30 days	$450 - $4,950	See above
Cayman Systems, Inc. (617) 494-1999	Gator Mail-M, Gator Mail-Q	Apple Macintosh Plus and higher	Macintosh OS 6.0.3	2M	From CE Quick Mail, Microsoft Mail to SMTP-based, Unix mail	SMTP	Databases, spreadsheets, word processing packages, any binary files	Underline	Yes	Finds cause of failed transmission, uses error correction protocol	Fax	NP	None	$995 - $7,995	None
CC:Mail, Inc. (415) 961-8800	CC:Mail Link to MCI Mail	IBM PCs and compatibles	DOS	640K	From CC:Mail to MCI Mail	MHS	See above	Tabs, foreign language keys	Yes	Finds cause of failed transmission, uses error correction protocol	Fax, telex, voice	Netware, Vines, 3+Share, 3+Open, LAN Manager	None	$1,295	$250
Computer Mail Services, Inc. (313) 559-3266	V-Bridge; V-Bridge/MHS	Banyan CNS server, 80386-, 80486-based Vines servers	DOS, Unix	640K	From Banyan Network Mail to MCI Mail; from Banyan Network to MHS	Proprietary, MHS	Any ASCII or binary files	All ASCII characters	Yes	Finds cause of failed transmission, uses error correction protocol	Fax, telex, postal and courier mail; none on MHS	Vines 3.1 and higher	30 days	$1,495 - $4,995	First 90 days free, then $495
	S-Bridge	PCs with simultaneous connections to local-area and TCP/IP networks	DOS 3.0 and higher	640K	From MHS to SMTP	MHS, SMTP	Any ASCII or binary files	All ASCII characters	Yes	See above	None	Netware, MS-NET	30 days	$2,495+	First 90 days free, then $495
	M-Bridge	PCs running Novell or Action Technologies MHS	DOS 3.0 and higher	640K	From MHS to MCI Mail	MHS	Any ASCII or binary files	All ASCII characters	Yes	See above	Fax, telex, postal and courier mail	Netware, MS-NET	30 days	$995	First 90 days free, then $195
Consumers Software, Inc. (604) 688-4548 (800) 663-8933	The Network Courier Gateway	IBM PCs and compatibles	DOS 3.1 and higher	256K	From Network Courier to Profs, X.400, SNADS, SMTP, MCI Mail, MHS	X.400, MHS, SMTP	Databases, spreadsheets, word processing packages	All ASCII characters	No	Finds cause of failed transmission, uses error correction protocol	Fax, telex	3+Open, Vines, DCA, MS-Net, PC LAN, Netware	30 days	$695 - $6,000	15% of price
Digital Equipment Corp. (800) 344-4825 (603) 884-6660	Message Router/Memo	DEC VAX	VMS	NA	From DEC Mailbus to Verimation's Memo	X.400	Word processing packages	Tabs, bold, underline, math symbols	Yes	Finds cause of failed transmission, indentifies message origin address	None	Decnet, SNA	None	$20,000	Variable
	VAX Message Router VMSmail Gateway	DEC VAX	VMS	NA	From DEC Mailbus to VMSmail, PCMail, Decwindows VMSmail	X.400	Databases, word processing packages	Tabs, bold, underline, math symbols	Yes	See above	None	Decnet	90 days	$600 - $28,900	Variable
	VAX Message Router/S Gateway; P Gateway	DEC VAX	VMS	NA	From DEC Mailbus to IBM Disoss; from DEC Mailbus to IBM Profs	X.400	Databases, spreadsheets, word processing packages, DOS files	Tabs, bold, underline, math symbols	Yes	See above	None	Decnet, SNA	90 days	$3,200 - $200,000 for S Gateway; $2,500 - $96,000 for P Gateway	Variable
	VAX Message Router X.400 Gateway	DEC VAX	VMS	NA	From DEC Mailbus to X.400	X.400	Databases, spreadsheets, word processing packages, DOS files	Tabs, bold, underline, math symbols	Yes	See above	None	Decnet, OSI	90 days	$1,900 - $80,000	Variable
	Message Router gateways for CC:Mail/MHS, Network Courier, 3Com 3+Mail	DEC VAX, IBM PCs and compatibles	VMS, DOS	NP	From DEC Mailbus to CC:Mail, MHS, Network Courier, 3Com 3+Mail	X.400, MHS	Word processing packages	Tabs, bold, underline, math symbols	Yes	See above	None	Decnet, Pathworks, Netware, OSI, 3+Share	None	$50,000	Variable
Enable Software, Inc.'s Higgins Group (415) 865-9805	Higgins Gateways	IBM PCs and compatibles	DOS 3.1 and higher	512K	From Higgins Mail to MHS, 3+Mail, Profs, SNADS	Proprietary	Databases, spreadsheets, word processing packages	None	Yes	Finds cause of failed transmission, uses error correction protocol	Fax	Netware, Vines, 3+Open, LAN Manager	None	$295+	None
Hewlett-Packard Co. (800) 752-0900	HP X.400	HP 9000 series	HP-UX	8M	From HP Desk Manager, Open Mail, Unix Mail to X.400	X.400, SMTP	Databases, spreadsheets, word processing packages, binary, ASCII files	Any characters known to X.400	Yes	Finds cause of failed transmission, uses error correction, allows departmental billing	Fax, telex	OSI	Variable	$6,500+	NP
IIS Technologies, Inc. (416) 890-2773	PSS Gateway M400	IBM 370	VM	NA	From X.400 to Profs	X.400	None	All IA5 characters	Yes	Finds cause of failed transmission	Fax, telex, voice	SNA	None	$18,300 - $34,200	15% of price
Immedia Telematics Corp. (415) 388-4748	Express	Tandem machines	Guardian	256K	From MHS to Tandem machines	MHS	Databases, spreadsheets, word processing packages, binary, ASCII files	Foreign language keys	No	Finds cause of failed transmission, uses error correction protocol	Fax	Netware	None	$1,500	15% of price
Joiner Associates, Inc. (608) 238-3417	JMail-MHS	DEC VAX	VMS 4.4 and higher	NA	From Da Vinci E-Mail, CC:Mail, Wordperfect Office, Higgins E-Mail, Network Courier, The Coordinator and other MHS systems to DEC All-In-1, VMSmail	MHS	Databases, spreadsheets, word processing packages	None	Yes	Finds cause of failed transmission	None	Netware, PCSA	30 days	$9,800	$1,500
Management System Designers, Inc. (703) 281-7440	Promulgate	Sun386I	SunOS 4.2	NA	From 3Com Mail to Unix-based mail	SMTP, UUCP	Databases, spreadsheets, word processing and graphics packages	Foreign language keys	No	Finds cause of failed transmission, uses error correction protocol	None	3+Open, 3+, XNS, TCP/IP	None	$31,500	Variable
	Promulgate/PC	IBM PCs and compatibles connected to Unix host	DOS	640K	From 3Com Mail to Unix-based mail	SMTP	Databases, spreadsheets, word processing and graphics packages	Foreign language keys	No	Finds cause of failed transmission, uses error correction protocol	None	3+Open, 3+, TCP/IP, Unix BSD, XNS	30 days	$5,995 for 50 users; $9,995 for unlimited users	Variable

[1]Messages can be exchanged bidirectionally between the electronic mail systems listed. [2]X.400 = messaging standard from the Consultative Committee for International Telephony and Telegraphy; MHS = Message Handling Service from Action Technology, Inc. and Novell, Inc.; SMTP = Simple Mail Transfer Protocol, which is the mail system for Transmission Control Protocol/Internet Protocol; UUCP = Unix to Unix Copy Program. [3]All products listed record the start time of each transmission, except gateways from Consumers Software, Inc. and Rational Data Systems, Inc. All products record the duration of each transmission, except those from Alisa Systems, inc., CC:Mail, Inc., Consumers Software, Inc., MCI Communications Corp. and Rational Data Systems, Inc. The LAN Office Gateway from Wang Laboratories, Inc. and the Mail Link Mac and Mail Link MHS from Starnine Technologies, Inc. do not record duration of transmission. [4]All maintenance fees are per year, unless otherwise noted. [5]Mail Link SMTP is also sold by Sitka Corp., which can be reached at either (800) 445-8677 or (415) 769-9669.

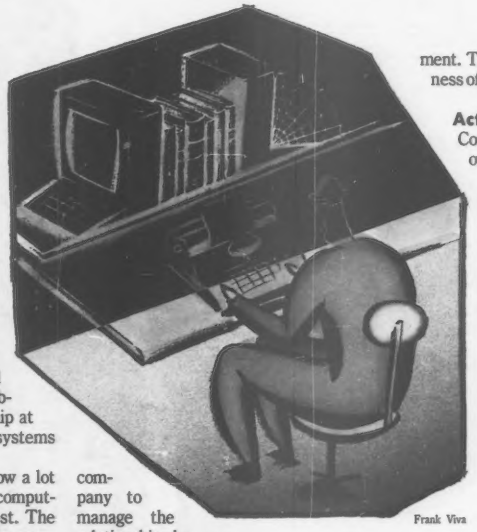
The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

VENDOR	PRODUCT	HARDWARE PLATFORM	OPERATING SYSTEMS SUPPORTED	RAM REQUIRED (BYTES)	SYSTEMS FOR WHICH TRANSLATION IS PROVIDED[1]	E-MAIL STANDARD[2]	SOURCES FOR FILE ATTACHMENTS	SPECIAL CHARACTERS TRANSLATED	PREPROGRAMMED MESSAGES	ADMINISTRATIVE FEATURES[3]	OTHER FUNCTIONS	NETWORK OPERATING SYSTEMS SUPPORTED	TRIAL PERIOD	PRICE	MAINTENANCE FEE[4]
Management System Designers, Inc. (Cont.)	Promulgate/Vines	IBM PCs and compatibles	DOS	640K	From 3Com Mail to Banyan Vines	Proprietary	Databases, spreadsheets, word processing and graphics packages	Tabs, bold, underline, foreign language keys, math symbols	No	Finds cause of failed transmission	None	3+Open, 3+, Vines, TCP/IP, XNS	30 days	$9,995 for unlimited users	Variable
MCI Communications Corp. (914) 934-6480	Mail Messenger/3000 for MCI Mail	HP 3000	MPE	NA	From HP Desk Manager and Postwaste to MCI Mail	Proprietary	Databases, spreadsheets, word processing packages	None	Yes	Finds cause of failed transmission, uses error correction protocol, logs files sent	Fax, telex, produces hard copy	NA	30 days	$10,000	First year free
	VAX Mailgate for MCI Mail	DEC VAX	VMS 5.0 and higher	NA	From DEC All-In-1 and VMSmail to MCI Mail	Proprietary	Databases, spreadsheets, word processing packages	None	Yes	See above	Fax, telex, produces hard copy	NA	30 days	$11,242	Variable
Notework Corp. (617) 734-4217	Notework/MHS Gateway	IBM PCs and compatibles	DOS	5K	From Notework to MHS	MHS	Databases, spreadsheets, word processing packages, binary files	Foreign language keys, tabs	Yes	Finds cause of failed transmission, uses error correction protocol	Fax	Netware 2.0, 3.0	30 days	$199	None
Pacer Software, Inc. (508) 694-3300	Pacer Post	DEC VAX, Apple Macintosh	VMS, Macintosh OS	1M	From Microsoft Mail to VMS Mail, Message Router	Proprietary	Databases, spreadsheets, word processing packages	Tabs, foreign language keys, math symbols	No	See above	None	Appletalk	30 days	$2,000 - $4,000	15% of price
Prime Computer, Inc. (508) 655-8000	X.400 Gateway Program for Message Handling Services	Prime EXL series	Unix	NA	From CC:Mail, Da Vinci, Higgins to X.400 MHS	X.400, MHS	Databases, spreadsheets, word processing packages	Any characters known to X.400	Yes	Records start time and duration of transmission, uses error correction protocol	NP	Prime EXL Portable Netware	None	Less than $8,000	$70 per month
	X.400 Gateway Program for Simple Mail Transfer Protocol	Prime 50 series	Primos	NP	From SMTP to X.400 MHS	X.400, SMTP	Databases, spreadsheets	See above	Yes	See above	None	NP	None	$8,000+	$68 per month
Rational Data Systems, Inc. (415) 499-3354	CEO/MHS Gateway	Data General MV series	AOS/VS	NA	From DG CEO to MHS	MHS	Databases, spreadsheets, word processing packages	None	No	Finds cause of failed transmission, uses error correction protocol, generates error reports	None	Any that supports MHS	None	$5,000	$1,250
Retix (213) 399-2200	Open Server 400	80386-based PCs and Unix host	DOS, Unix	640K	From CC:Mail, Da Vinci, MHS, SMTP to X.400	X.400	Word processing packages, other E-mail systems	Teletex, IA5 characters	Yes	Finds cause of failed transmission, notifies sender of delivery status	None	Netware, 3P, PC LAN, Olinet, Vines Networks	30 days	$5,000	$500 with warranty; $750 without warranty
	MHS Gateway (MG-150)	IBM PCs and compatibles	DOS	640K	From MHS to X.400	MHS	Word processing packages, other E-mail systems	Teletex, IA5 characters	Yes	Finds cause of failed transmission, uses error correction protocol, notifies sender of delivery status	None	Any that supports MHS	30 days	$995	$100
Starnine Technologies, Inc. (415) 548-0391	Mail Link SMTP[5]	Apple Macintosh Plus and higher	Macintosh OS 6.0.1 and higher	300K	From Quickmail, Inbox Plus, Microsoft Mail to SMTP	SMTP	Databases, spreadsheets, word processing packages	All 8-bit characters	Yes	Finds cause of failed transmission	None	Network independent	None	$995 for 10 users, $4,950 for 100 users	None
	Mail Link Mac	Apple Macintosh Plus and higher	Macintosh OS 6.0.3 and higher	300K	From Quickmail, Inbox, Microsoft Mail to Unix mail systems	UUCP	Databases, spreadsheets, word processing packages	All 8-bit characters	Optional	See above	None	Network independent	None	$195 for 10 users, $995 for 100 users	$30 - $150
	Mail Link MHS	Apple Macintosh Plus and higher	Macintosh OS 6.0.3 and higher	300K	From Quickmail, Microsoft Mail, Inbox Plus to MHS	MHS	Databases, spreadsheets, word processing packages	All 8-bit characters	Optional	See above	None	Appleshare, Netware	None	See above	None
Sun Microsystems, Inc. (415) 336-5761	Sunnet MHS 6.0	Sun-3, Sun-4	SunOS 4.0 and higher	8M	From SMTP to X.400	X.400	None	None	Yes	Finds cause of failed transmission	None	OSI, TCP/IP	Variable	$6,700	$100
The Boston Software Works, Inc. (617) 367-6846	Interoffix	Wang VS System 5300 to 10000 series	VS OS 7.20	NA	From Wang VS Office to Unix-based mail	UUCP	Any ASCII files	Tabs, bold, underline, foreign language keys, math symbols, special word processing symbols	No	Finds cause of failed transmission, uses error correction protocol, synchronizes user directories	None	Any that support UUCP	30 days	$6,500 - $22,500	20% of price
	Interoffice/VS	Wang VS 5300 to 10000 series	VS OS 7.20	NA	From Wang VS Office to IBM Office Vision/400, HP Desk Manager, DEC All-In-1	Proprietary	Any binary files	See above	No	See above	Fax, telex	Wang systems networking	30 days	$4,500 - $21,500	20% of price
	Interoffice/XL	HP 3000 922XL to 980/100 series	MPE/XL	NA	From HP Desk Manager to Wang VS Office, IBM Office Vision/400, DEC All-In-1	Proprietary	Any binary files	See above	No	See above	Fax, telex	HP's MPE-XL network	30 days	$4,500 - $19,000	20% of price
	Interoffice/VAX	DEC 11/725 to 9000 series	VAX/VMS	NA	From DEC All-In-1 to HP Desk Manager, Wang VS Office, IBM Office Vision/400	Proprietary	Any binary and A1 files	See above	No	See above	Fax, telex	Decnet	30 days	$5,500 - $21,500	20% of price
Touch Communications, Inc. (408) 374-2500	Worldtalk 400 family	80386-based PCs	DOS, Unix	4M	From X.400 to MHS, SMTP, CC:Mail, Microsoft Mail, Quickmail, Higgins, Inbox Plus	X.400	Databases, spreadsheets, word processing packages	Tabs, bold, underline, foreign language keys, math symbols	Yes	Finds cause of failed transmission, uses error correction protocol	Fax, telex	Netware, 3+Open, Vines, LAN Manager	None	$10,000+	$2,000+
Unisys Corp. (801) 594-4310	MHS-6000	Unisys V6000 series	Unix SVR-3	800K	From X.400 to Unix-based mail	X.400, MHS, SMTP	None	Tabs, bold, underline, foreign language keys, math symbols, all 16-bit characters	No	None	Fax, telex	Any 802.3, asynchronous, X.25	None	$2,000 - $10,800 for five-year license	$35 - $152 per month
Wang Laboratories, Inc. (508) 451-5000	LAN Office gateways	IBM PCs and compatibles	DOS 3.2 and higher	NP	From LAN Office to VS Office	Proprietary	ASCII files	Tabs, bold, underline, foreign language keys, math symbols	No	Finds cause of failed transmission	None	Netware, Vines, 3+Open, PC LAN	None	$995	None
	Wang Office/X.400 Gateway	Wang VS machines	Wang VS 7.14.04 and higher	NA	From Wang Office to X.400	X.400	Databases, spreadsheets, word processing packages	Tabs, foreign language keys	No	Finds cause of failed transmission, uses error correction protocol	Fax	Any supported by Wang VS	None	$1,350 - $17,500	None
Wordperfect Corp. (801) 225-5000	Wordperfect Connections MHS Gateway	IBM PCs and compatibles	DOS 3.0 and higher	640K	From Wordperfect Office to MHS	MHS	Databases, spreadsheets, word processing packages	Tabs	Yes	Uses error correction protocol	Fax, telex	Netware	None	$495	None

Misuse of power

Poor IS and business management leadership can doom a technology implementation before it starts

BY VICKI MCCONNELL and KARL KOCH



Frank Viva

There is an abuse problem in corporate America today that nobody likes to talk about. Computers and information technology have been misused and underused by those who are ill-prepared to use them. In addition, computer users have been abused by the manner in which technical systems are implemented. What most companies don't realize is that this dysfunctional relationship between users and technology is not a technological problem. It is a problem of poor leadership at all levels of business and information systems management.

The reality is that companies know a lot about a few aspects of implementing computer systems and a little about the rest. The knowledge base they have is poorly organized. Most businesspeople cannot point to one document in their corporate files that gives complete guidelines on how to go about implementing a computer system. Yet many organizations (dare we say *all*?) have voluminous records of implementations gone awry, of applications unused and underused and of the stated dissatisfaction of users.

To ease the implementation process, IS and business managers need an inventory of what can go wrong, an organized methodology for implementing computer systems and information technologies and a rigorous argument for proper and effective procedures for implementing information technology.

What can go wrong

The IS professional typically views the problems of computerization in terms of the technology rather than in terms of the business. That is, when an implementation falters or fails, it is seen as a missed opportunity to use the technology.

What has really happened, however, is a failure of the company to manage the relationship between its technology and its users.

Top business and IS management must set the criteria for technology use and implementation — that the technology serves the product or service of the business and that it serves the organization's human system. Executives also need to make sure that IS staffs are educated and trained in the business. When the technology invades every area of the business, the technician must be schooled in all areas of the business.

One of the best ways for an organization to educate its technical staff about the business is through a collaboration between technician and user during systems development. They can train each other in the business of the organization.

Action at all levels

Computer implementations have their own set of management requirements. There are certain actions that must be taken at the operational, tactical and strategic levels of an organization's management if computer implementations are to work. When the proper issues are addressed at all three levels, the implementation will succeed. When they are not, it will fail.

The operational requirements involve the setting of clear and stated expectations for the user. Two items must be included: what worker behaviors will change and what benefits the company will accrue from technology implementations.

Abuse occurs when user managers are unclear about the expectations they have of their employees (see example below). They either narrow their focus and expect too little of their users, or they fail to define the new behaviors they expect once the computer system is implemented. Only when user managers learn to set broad and comprehensive behavioral expectations for end-user staff will there be a more effective use of information technology (see story page 69).

Setting the requirements for managing computer implementations is more difficult at the tactical management level of organizations. Firms everywhere are redefining the role of middle managers. Most of them are also seeking to eliminate layers of middle management. What is rarely recognized is that information technology is affecting this change because it provides many options for the way in which middle management can be handled and grouped.

Top management must set the goal of changing the manner in which middle management functions. First, it needs to analyze the changes needed in middle management, then apply information technology as one tool in that change.

Middle managers will not necessarily be replaced by computers because the basic functions these people provide — consistency in the work and behaviors

Continued on page 68

EXAMPLE 1

Crossed communications lines

Want to know what can happen to a technology implementation when user managers have unclear expectations of their users? Read on:

An on-line inventory control system was implemented in a Midwestern farm equipment manufacturing company. The inventory control personnel who were going to use the system had little or no knowledge of basic computer terms and terminal operation. Before system implementation, they received no computer education and minimal training. As a result of management's failure to prepare users, the inventory control system was not fully operational for 10 months beyond the original start date, and the cost of the system skyrocketed from $250,000 to $1 million. The users were frustrated and angry because they did not receive proper support during the system's installation. They did not understand what management expected of them, nor did they know how to relate to the company's IS staff, who designed and implemented the system.

McConnell and Koch are co-founders and principals of The Mentor Group, a management consulting and training firm in Columbus, Ohio. They are also co-authors of the book *Computerizing the Corporation: The Intimate Link Between People and Machines* (Van Nostrand Reinhold).

Continued from page 67

of the firm — are important. Rather, a successful implementation of information technology can bring a whole new range of skills and capabilities to middle managers, such as the following:

- Decision thinking. The redefinition of planning. Rather than focusing on making decisions, the middle managers are more concerned with thinking toward a decision.
- Data interpreter. The supplier of new knowledge.
- Organizing responsibility. The new way to delegate. Focus on responsibility, not tasks.
- Front line. The new management style. Empowering and supporting those operational workers with customer contact.
- New knowledge skills. The real flattening of the hierarchy.
- Continuous learning. The ultimate challenge.

CHOOSE THE BATTLEFIELD. The true battle is not over technology; it is about the kind of business management wants and the kinds of employees management wants.

Always remember: Whatever is done to middle management will change the entire organization. Top IS and business management should not implement technical systems in middle management until they have analyzed the impact of automation on the quality of the organization's human interaction.

Technology cannot have this kind of effect on an organization without a driving vision of what the corporation intends to achieve in its business, with its technology and through its

EXAMPLE 2

Fiascos

Technology implementations, when done correctly, should not disrupt strategic management of an organization.

But when done poorly, they certainly can, as the following examples show:

- An international fast-food chain introduced a computerized system for retrieving store operations information. The system was intended to move information up through the organization to senior management. Instead, the information jumped management levels and was sent directly to corporate headquarters. As a result, senior managers had much greater detail on store operations than the store managers had. This information was then used by some senior managers to reprimand store managers' performance.
- A major Midwestern manufacturer decided to computerize its production management systems. Approximately half of the affected employees were convinced that they would lose their jobs. They assumed cost cutting and staff reductions were the main reasons why management had instituted the change. The installation of the new system caused a number of employees to retire or quit. Those who stayed rebelled against the technology, causing a five-fold increase in the cost of the system and an extra seven months of installation time.
- A state bureau of motor vehicles computerized license plate records and sales information. During the planning phase, the administration solicited ideas and opinions of line workers and supervisors. Although their input was used, they got no feedback. They came to the conclusion that their participation was a waste of time because management never listened to them anyway.

employees. That vision must exist at the strategic management level to direct the development and use of the corporation's technology. Automation will not disrupt strategic management of an organization. However, improper management of a technology implementation will (see example page 68).

Management at all levels must prepare its people and its organization for a future of constant technological pressures. This will be facilitated if management has a methodology for implementing computers and if employees know the value of and concepts behind this methodology (see outline below).

Controlling corporate change

There are dynamic ways of managing change that can help corporate leaders gain control over the future of the corporation in a world of changing technology. Top management must recognize that change is most effective when it is cyclical and iterative. People require time to practice the new forms of work. They must be cycled and recycled through the process of learning a change.

Change is also most effective when it is incremental and planned. In other words, people will respond positively when the change fits into the vision of the corporation and occurs in reasonable steps leading in that direction. Change is most effective when it leads to an openness to future change and creates a corporate climate that accepts and prepares for change.

To maintain control of the company's technological future, top management must do the following:

- Set common expectations regarding technology.
- Control technology through management of people.
- Recognize trends in technology development as they relate to the business.
- Recognize the need to organize the entire business to control its technology.

Creating a corporate climate that accepts changing technologies will require three executive management decisions. The first is decide who is in charge. The technology takes charge only when top management defaults on decision-making. Top management will be in charge of its technology when it decides to be.

The second decision is choose the battlefield. The true battle is not over technology; it is about the kind of business management wants and the kinds of employees management wants. Management will be in charge of technology when it develops its business and employees.

The third is kick the dependency habit. No business needs technology. Management will be in charge of its technology when it considers itself free to accept — or reject — any new technology. Management may choose more often than not to use new technologies, but this must be a choice made freely. Only a free choice leaves management in control.

The problems involved in implementing computer systems and information technology are only the symptoms of a larger issue: whether top management stays in control while constantly changing and upgrading its information technology. The answer lies in the values of the corporation. People must be valued above machines, the business above its technology. Then, the corporation must have a way to implement information technology that honors and supports these values. •

The Technology Implementation Life Cycle*

A guide for implementing information technology

Leadership stage

Phase 1: **Pre-implementation**
Goal: Determine planning alternatives, needed resources and possible roadblocks
Activity: Gather data on workplace, personnel, work, tasks

Phase 2: **Human design**
Goal: Eliminate deterrents and establish incentives for worker productivity and wellness
Activity: Study automated workplace and establish criteria for its human design

Phase 3: **Marketing**
Goal: Introduce technology so that the employee "buys" the system and "owns" the system
Activity: Develop and implement a strategy for "selling" technical systems and the changes they cause

Phase 4: **Education**
Goal: Reduce employee stress concerning technology and increase confidence in their ability to use it productively
Activity: Educate employees about the demands new technology will make on them and the benefits it will provide

Administrative stage

Phase 5: **Training**
Goal: Develop employees who are minimally computer competent and primed to learn additional computer skills
Activity: Develop and implement a sequential, natural program of skill growth

Phase 6: **Documentation**
Goal: Provide easy access to and effective assistance from reference materials so that employees can complete automated tasks
Activity: Compose and distribute documents that explain how the system works

Phase 7: **Human communication**
Goal: Create opportunities for dialogue between employees and information technology, technicians and management
Activity: Establish and maintain continuing means of communication with employees

Phase 8: **Postimplementation**
Goal: Feed forward evaluation results to improve the next technology implementation
Activity: Compile the evaluation of each phase into one document and review entire implementation process

*This method is a registered trademark of The Mentor Group

Great expectations: How users will behave

Technology will be used effectively if managers know what kinds of behavior to expect from employees.

Managers can use the following categories to help them set behavioral expectations:

- **Productivity.** Once started on a specific computer task, how productive is the employee in a given time period?
- **Proficiency.** How much of a specific software application has the employee mastered?
- **Efficiency.** How well can the employee use all functions mastered in a given software application, moving from one task to another with ease?
- **Effectiveness.** How well can the person choose between options in mastered software applications?
- **Attitude.** Given past experience with computers, how positive is the employee's attitude toward present and future performance with the technology?
- **Quality.** How well can the employee perform according to corporate and work-group standards?

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TRACKS	CORPORATE END-USER ISSUES	PRODUCT PROMISES & REALITY	CONNECTIVITY	INDUSTRY ISSUES	WINDOWS & OS/2 DEVELOPMENT	NEW TECHNOLOGY & MEDIA
TUESDAY, MARCH 5						
9-10 am	KEYNOTE					
10:30 - Noon	Downsizing from Mainframes & Minicomputers	Beyond Politics—DOS/ Windows vs.OS/2 PM—The User's Perspective	A Day in the Life of a LAN Manager	Window Dressing		Directions in Multimedia
2-3 pm	Cost-Justifying the Graphical User Interface	Facts & Figures: Graphical Spreadsheets	The Future of GUI Workstation Connectivity		Thinking GUI	Digitized Video
4-5:30 pm				State of the Channel	Development of Portable Software	Corporate Education & Multimedia
WEDNESDAY, MARCH 6						
9-10:30 am	PLENARY SESSION					
11-12:30 pm	Word Processing Solutions		Global Connectivity Under OS/2: Is the Package Deal a Better Deal?	Can Windows Win the GUI War?	Windows or OS/2 - Which is for You?	Authoring Tools
2-3:30 pm	Everything You Always Wanted to Know About Windows But Were Afraid to Ask!					
4-5:30 pm	Security Concerns	Presenting... PM & Windows Presentation Programs		What's Hot & What's Not in Windows	Development Using Windows Macro Languages	Distributing Multimedia Applications
THURSDAY, MARCH 7						
9-10 am	DEVELOPER'S KEYNOTE					
10:30 - Noon	End User Development	Programming for the Rest of Us	Network Management Under Windows & OS/2	Managing the Migration	Development Using High Productivity Programming Languages	
2-3:30 pm	Database Server Inquisition	Visual Representation of Data		Marketing Windows in the USA & Europe	Windows/PM Development Using the SDK	Sound & MIDI

KEYNOTE

Directions For The Decade

Cheryl Currid,
Director, Applied Information Technology, Coca Cola Foods

PLENARY

Session:
Windows 3.0— The Second Year

Chair:
Stewart Alsop
Editor/Publisher, P.C. Letter

Panelists:
Don Casey,
Vice President, Spreadsheet Division, Lotus Development Corp.

Paul Grayson,
President, Micrografx, Inc.

Brad A. Silverberg,
Vice President, Systems Division, Microsoft Corp.

DEVELOPER'S KEYNOTE

Megatrends in Software Development

Said Mohammadioun,
President, Samna Corp.

EXHIBITORS
as of January 7, 1991

1Soft Corp.
Absolute Solutions
Access Softek
Accounting By Design
Adobe Systems
Adonis Corp.
Aldus Corporation
Alien Computing
Amax Engineering
Archetype, Inc.
Artel Informatica
ASD Software
AspenSoft
AST Research
Atech Software
Attachmate Corp.
Automated Design Systems
Berkeley Systems
Blue Sky Corp.
Blyth Software
Borland
Brown-Wagh Publishing
BYTE Magazine
Cadre Technologies
Calculus, Inc.
Calera Recognition Systems
Capella Systems
Caseworks, Inc.
Channel Computing
Chi Corporation
Communications Week
Computer Associates
Computer Currents
Computer Language
Computer Support Corp.
Computerworld
Corel Systems
Coromandel Industries
Corporate Software
DBMS
DCA, Inc.
Delrina Technology
Deltapoint, Inc.
Design Science
Distinct Corporation
Echelon Development Corp.
Elcon Technologies
Eilon Systems Inc
Elographics, Inc.
Enfin Software Corp.
Executrain
ExpertEase Systems
Franklin Software
FTG Data Systems
Future Tech Systems
GRiD Systems Corp.
GUIdance Technologies
hDC Computer Corp.
Heulett Packard
IBM Desktop Software
Icom Simulations
Image-In, Inc.
Information Builders
Informix Software
InfoWorld
Intel PCEO
IntelliCorp
Intelligent Environments
Jensen and Partners Intl.
Jetform
Knowledge Garden
LAN Technology
LAN Times
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mdbs, Inc.
Micrografx
MicroQuill, Inc.
Microsoft Corp.
Multiscope
NBI Inc
Network World
Neuron Data
NewTools
OS/2 and Windows Mag
OSI
Out International
ParcPlace Systems
Passport
PC By Root
PC Elcetera
PC Week
PC Week Labs
Personal Workstation
Phicon
Pilot Executive Software
Pinnacle Publishing
Pioneer Software
Polaris Software
Precision Software
Prisma Software Corp.
ProtoView Development
Publishing Technologies
QMS, Inc.
Qualitas
Radius Inc.
Rainbow Technologies
Rasterops
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Sanos Corporation
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Software Ventures
Software Workshop
SVCS
Symbiologic Corp.
Synaptics
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The Stirling Group
The Whitewater Group
ThreadZ Software
Tri-Data Systems
U-Lead
Ultimate Software
Unitrac Software
Ventura Software
Video Seven
Viewpoint Systems
VZ Corporation
Wall Data Inc.
Wang Laboratories
White Fox Communications
WIGNET
WordPerfect
WPMA
Zenographics
ZSoft Corp.

Registration
Conference sessions and exhibits: $495, if registration and payment is received on or before February 18, 1991. On-site registration, if available, is $545.

Complete conference and registration information
Phone: 415-601-5000 Fax: 415-601-5075
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(for Conference registrants only) Windows applications suites developed by or for major corporations, focusing on:

Document Management • Heterogeneous Database Integration • IBM Host Connectivity • We will identify the resources needed by corporate MIS directors to effectively establish and maintain Windows or OS/2-based LANs.

GET ACQUAINTED RECEPTION
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SPECIAL EXHIBIT FLOOR ATTRACTIONS

PC Week Labs Shoot-Out Watch the heated competition live, on-stage as vendors compete at creating specific solutions to typical business tasks.

Windows Connection (Hosted by Computer Currents) Connect with developers, distributors, resellers, or find your new Windows or OS/2 career opportunity.

Computerworld's Strategic Application Forum Panel discussion of adopters and doubters, and the reasons behind each.

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GUI Test Drive Center Take the latest Windows and OS/2 applications for a test drive in an informal, no-pressure environment.

Seminars for Programmers A series of special seminars for programmers developing Windows and OS/2 applications will be held throughout the 3-day event.

The Great Software Giveaway Over $25,000 in software and other prizes will be given away in special drawings.

NATIONAL
BRIEFS

I'm outta here

In what the company stated were wholly unrelated moves, three of **LSI Logic Corp.**'s top executives unexpectedly left the Milpitas, Calif.-based semiconductor firm earlier this month. **William O'Meara**, who co-founded LSI and was serving as president of its Headland subsidiary, departed on a six-month sabbatical. Whether he will return to LSI at the end of that time and in what role was left open. Marketing Vice President **Brian Connors** left to take on the U.S. sales vice presidency at Mountain View, Calif.-based Synoptics, Inc. Meanwhile, LSI's loss is **Businessland, Inc.**'s gain — former Chief Financial Officer D. Scott Mercer is taking on the same title at the computer reseller.

Ready, steady, go

This month marked the third and final stage in the melding of **Control Data Corp.'s** third-party computer maintenance business with the former **Sorbus** to create Frazer, Pa.-based **Bell Atlantic Business Systems Services.** Also effective earlier this month: the post-consolidation elimination of 240 out of a total 3,600 jobs at Philadelphia-based **Bell Atlantic Corp.**'s new computer services subsidiary. The firm, reconfigured and renamed in the wake of the communications company's January 1990 acquisition of the CDC division, is now pared of redundant operations, slimmer by an entire level of management and well positioned for decision-making closer to the customer, according to Bell Atlantic.

Lessor is more

Some analysts and most leasing companies have spent the past few recession-shadowed months contending that when the economic going gets tough, the tough start leasing. No one is going to prove that theory wrong by the 1990 financial results posted last week by the computer leasing industry's runaway up-and-comer, **IBM Credit Corp.** The IBM leasing subsidiary reported volume up 14% year-over-year to $10.6 billion, and portfolio assets of $11.1 billion — an 18% increase. IBM Credit Corp.'s net earnings jumped 21% to $166 million.

Interleaf theme: Turn, turn, turn

A new president is the most recent change intended to reinvent the firm

BY PAUL GILLIN
CW STAFF

WALTHAM, Mass. — When Interleaf, Inc. employees arrived for their first day of work at the company's new headquarters early this month, they found that more than just their surroundings had changed.

Posters around the building broke the news that Robert Weiler, who engineered a top-to-bottom overhaul of the company in 1990, was leaving the president's post after just 15 months to take a job as senior vice president of sales and marketing at Lotus Development Corp. He was replaced by Mark Ruport, 38, an ex-Cullinet Software, Inc. and Informix Corp. executive who had been at Interleaf just seven months.

At some firms, revolving doors in the executive suite prove jarring. Interleaf employees and customers, however, are getting used to all kinds of changes these days as the company struggles to reverse a two-year slide.

Interleaf built a reputation for highly functional publishing software in the mid-1980s but has since suffered intense competitive pressures and been ravaged by internal cost inefficiencies.

Ex-Cullinet President Weiler was tapped in October 1989 to turn the firm around. "When I got here, the company was portrayed as stalled," he said in an interview last month. "What I didn't realize was how fast it was spiraling downward."

Weiler and a new management team took dramatic steps to reverse the spiral. Since Weiler took over the company has laid off 18% of its employees, dumped a hardware business that had become an earnings albatross, replaced five of its six vice presidents, overhauled its sales force and begun a campaign to become hardware independent.

"They have a [turnaround] strategy, but it is a long process," said David S. Nelson, vice president at Shearson Lehman Brothers, Inc. The strategy appears to be progressing. Interleaf reported a narrow $670,000 quarter profit last week, its second straight quarter in the black.

Now it is up to Ruport to make the changes work. "My strength is in implementation, and we're in an implementation phase now," he said.

Interleaf has little margin for error. Low-end desktop publishing competitors are challenging it with increasingly elegant functions at a fraction of Interleaf's premium price ($2,400 to $15,000 for the workstation software, depending on features). Big firms such as Xerox Corp. and IBM are showing increasing interest in getting a piece of the document preparation business. And Interleaf's financial health is shaky. The company's stock is trading at less than $4 per share against an all-time high of more than $25.

Interleaf's comeback strategy is to distance itself from the commodity desktop publishing market and target high-end document management, including graphics, version control and routing — the kind of heavy tracking that is typical of government contract work. "The major thing we have to address is the transition from electronic publishing into something that's much broader," Ruport said. Interleaf released its first major product in this area last year — a $70,000 piece of mainframe software called Relational Document Manager.

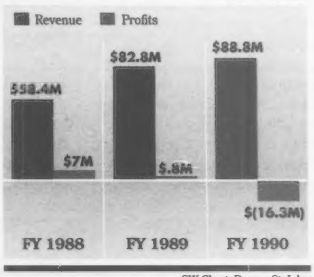
The company is also putting a lot of faith in the new release of its mainsteam publishing system, called Interleaf 5. The package, which shipped late last month, features a data-sharing technology called "active documents," which allows documents to be linked to each other and to other applications in such a way that sharing data and moving around is very transparent.

Grumman Corp.'s Electronics Systems Division in Melville, N.Y., has used that technology in a hardware/software product it created for customers who do their own maintenance of Grumman products. The Portable Maintenance Aid puts more than 100M bytes of documentation on a portable Sun Microsystems, Inc. workstation with

Continued on page 73

Turnaround time

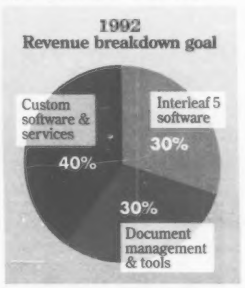
Interleaf President Mark Ruport (right) faces the task of reversing an earnings trend that has been heading steadily downward



CW Chart: Doreen St. John

Priority shift

Having left the hardware business, Interleaf is eyeing a radically different revenue mix by 1992



CW Chart: Doreen St. John

Mac Classic is shining star in Apple's sky

BY JAMES DALY
CW STAFF

PALO ALTO, Calif. — Apple Computer, Inc.'s low-cost Macintosh Classic is gunning to become the best-selling Macintosh ever, and Apple's two highest executives said it is only the beginning: The company is planning an aggressive series of introductions this year designed to pump technological adrenalin into its product line.

Chairman John Sculley and Chief Operating Officer Michael Spindler said at a recent briefing that Apple is hard at work on infrared technology to produce wireless computer networks and a lightweight notebook-size computer that sources said could arrive as early as August. Additionally, the System 7.0 operating system update should be in users' hands by the summer.

Sculley said the moves will play a vital role in counteracting the myopia that has crept into the Cupertino, Calif.-based organization. "We've been looking inward too much," he said. "We've been trying to sell to people who already own a system, and if we only do that, we're not going to be an important player."

Despite the mounting recession, Sculley said he expects that Apple's new economic model — cutting prices in order to increase market share — will help the company maintain a 10% growth rate for 1991. "Everything we do is aimed at gaining market share," he said. Sculley added that Apple's most intense competition will come from makers of IBM Personal Computer-compatible clones.

Despite the challenges ahead, Sculley and Spindler were upbeat and confident about current Macintosh sales. Demand for the Macintosh Classic — which was introduced in October along with the Macintosh LC and Macintosh SI — has been "stupendous," Sculley said.

In the quarter ended Dec. 31, 1990, Sculley said Apple shipped more Classics than the total number of Macintosh Pluses shipped in its best year. The company also expects 1991 Classic shipments to exceed the annual sales record of the wildly successful Apple IIE, which Sculley said sold more than 500,000 units in its best year.

The downside of the Classic's success, however, has been a widespread shortage of both the $999 floppy-based and $1,499 hard drive versions. Spindler noted that the backlog will not be eradicated until March. He added that when Apple did its initial market demand forecast last spring, "things looked different." He added that the firm "would have been crazy" to gear up for maximum demand.

During the last few months, Apple has tried to boost production of the Classic by increasing operating hours at manufacturing facilities and streamlining delivery channels. The lessons learned from the Classic shortage, however, have allowed Apple to plan large shipments of the Macintosh LC in February, one month earlier than the general availability date.

COMMENTARY

J. A. Savage

Taking what you're given

Take a couple of hypothetical users: Jane from Dungeons University and Dick from the Institute of Dragons. Both are charged with taking care of the technical computing needs of their students. Jane has a stock of Hewlett-Packard/Apollo workstations; Dick has workstations from Sun Microsystems.

Pretend that both Dick and Jane have the same budgets and needs. Where they differ is in what they expect — and what they get — from their vendors.

Jane expects HP to make the migration to the next version of the Open Software Foundation's OSF1 operating system easy. She screamed after being told that OSF1 would not be available on all the old versions of the workstations. When HP heard the piercing cries of its users, it scrambled to satisfy them. In the end, the firm compromised, saying it would offer the new operating system on older machines that upgraded to the Motorola 68040 processor.

Dick was barely fazed when Sun told him older Sun models would not get an upgrade to AT&T's Unix System V, Release 4 operating system — period. "That's progress," he said. And when Sun said all new software, including the operating system, would be available only on compact disc/read-only memory (CD/ROM), Dick shrugged again. "What's another thousand bucks for a CD/ROM drive?" he asked.

Sun is out to make money, and it won't take any whining from users. These are the breaks in the real world. Sun Chief Executive Officer Scott McNealy cynically said to one such user, "We apologize that technology moves forward."

HP, on the other hand, takes whining seriously. Old products are offered for decades to please small groups of users. This impacts HP's resources and, quite likely, its profitability. For instance, a Unix-based minicomputer rollout was recently delayed for four months because the firm simply didn't have the engineering resources to get it out on time.

McNealy intimated that Sun does not have the resources to port software to all of its platforms in the future. "In five years, we may have to port software to five different platforms; that's not trivial," he said. So instead of spreading its resources thin, Sun will likely cut off older products from new software.

McNealy also suggested that users not only provide for maintenance of current Sun systems with separate hardware budgets, but that such budgets should include the cost of hardware upgrades every six months.

I'm still trying to figure out why Dick is happy with a vendor that asks him to make these cold, hard changes so quickly. All I can divine is that it must be his attitude toward money. Dick is spending other people's money and can always figure out a way to carve it up to accommodate whatever Sun throws at him. Jane also spends other people's money, but she takes it personally — as if her sofa dealer suddenly said that she had to buy a new sofa while her old one was still perfectly good.

Savage is a *Computerworld* West Coast senior correspondent.

INTERNATIONAL BRIEFS

Taking care of Businessland

Computer reseller **Businessland, Inc.** will continue its fight back to the black ink that has eluded it in recent quarters with a new lieutenant. **Wayne P. Henry**, who came to Businessland one year ago as part of the firm's acquisition of Springfield, N.J.-based Data Systems Computer Centre, Inc., will replace Robert Henderson as senior vice president and general manager at **Businessland Canada Ltd.** Chief Executive Officer David Norman, to whom the new head of the Canadian subsidiary will report, noted that Henry's former position as Data Systems' chief financial officer will give his new corporate charge "the needed focus on profitability."

Robocoup

IBM German subsidiary **IBM Deutschland GmbH** earlier this month signed a joint venture deal with three sales firms that once belonged to East German electronics group **Robotron.** According to IBM, the new Berlin-based firm — called **Computer Service Partner GmbH** — will offer computer services in what used to be East Germany. It will employ about 150 people. State-owned Robotron, which once employed 68,000, has shrunk to a work force of 15,000, leveled by subsidiaries' cooperation with Western firms or declarations of independence in the wake of the reunification of the two German economies last year.

Hang-up

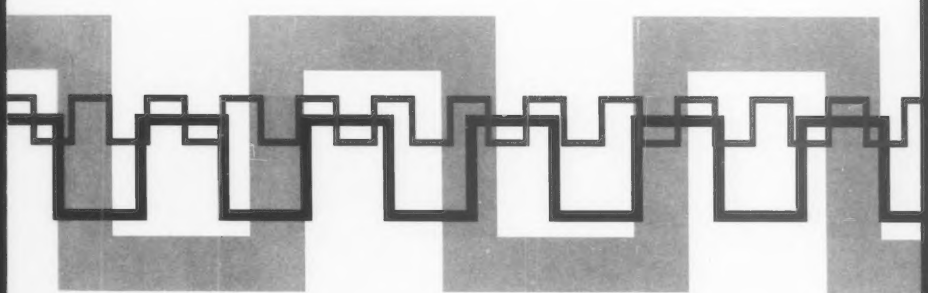
The **UK** government recently abandoned plans to introduce a nationwide voice and data network serving approximately 800 sites. The project, hailed on announcement as evidence of the government's commitment to new technology, reportedly was put on permanent hold when **Racal Electronics UK** — the only company invited to tender for the contract — failed to come to terms with the government on price.

Too much

Nihon Unisys Ltd., Unisys Corp.'s Japanese subsidiary, has been slapped with a $13.1 million tax penalty for overstating expenditures on its fiscal 1989 tax return, according to the Japanese press.

Connections

INSIGHT



DATA

The 1990s—
The Decade of Data

Information is a valuable commodity. For the Management Information Systems (MIS) manager or other information broker, the ability to process data as easily as voice is vital in today's information marketplace.

Business users are in a constant search for new services and techniques that will help them move information easily, quickly, and cost effectively. When searching for these solutions, MIS managers are concerned about being locked into a single approach or choosing an approach that will be obsolete tomorrow. And the rapid growth in the industry means the equipment they choose must be compatible with equipment from a variety of vendors.

The business industry is finding that the answer to all these concerns can be provided by the local telephone office. Data users are demanding speed and flexibility. In addition to speed and flexibility offered at a reasonable price, the public network provides data services with the same reliability and universality as voice calls switched through the central office.

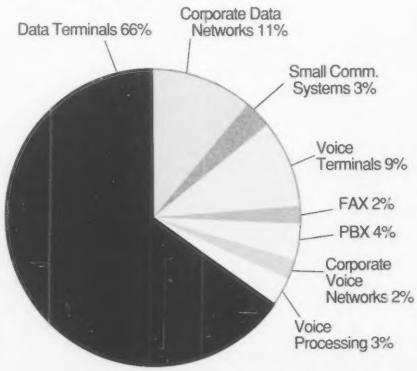
Recent studies show that in a United States business telecommunications market worth more than $80 billion, data terminals account for 66 percent of all sales, and corporate data networks another 11 percent. The significant growth in the demand for data is due to the almost universal penetration during the last 10 years of personal computers (PCs) into the workplace.

This proliferation of desktop PCs has increased the need for easy, universal access to mainframes, on-line information services, Local Area Networks (LANs), and Wide Area Networks (WANs). Perhaps the most urgent capability for users today is the ability to interconnect LANs. According to industry experts, the projected compounded annual growth rate for the data market is from 17 to 30 percent. Within that market, LAN interconnect is expected to grow 35 to 45 percent.

Along with maximum speed at a low cost, data users are looking for ease of installation. Security is another requirement, necessitating closed user groups that restrict data communications to selected telephone numbers. For IBM, DEC, HP, Apple, and other computer manufacturers, the need for standard interface specifications and compatibility is a primary requirement.

Data communications solutions for the 1990s must meet these demands and more.

1990 US Office Communications Market $80.5B—Growing at 12%



Compounded Annual Growth Rate

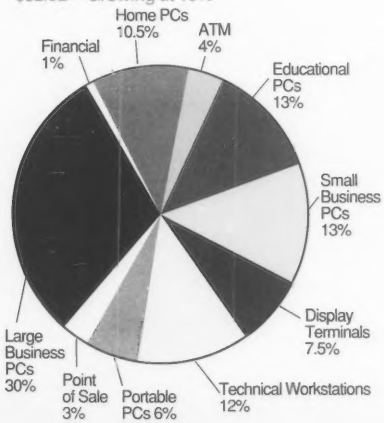
The Central Office Solution

Now the telephone company offers users a powerful data network—an alternative solution to expensive private networks with dedicated or leased lines. New digital technologies have placed the public network in an unparalleled position of strength.

In addition to cost savings, the public network option enables businesses to buy service on demand, offer its customers the most up-to-date features and technology,and provide 24-hour maintenance and emergency power supplies. Advantages include:

- nationwide coverage, with data access and connectivity extending everywhere the public network reaches;
- multiple data services and technologies that flexibly match different users' needs;
- on-demand resources that can quickly be adapted to the changing requirements of business; and
- adherence to standards and common interface specifications that allow the interworking of equipment from multiple vendors.

1990 US Data Terminals Market
$52.6B—Growing at 13%



Compounded Annual Growth Rate

Solutions Applied. With the growth of computing resources, the data user has become more and more sophisticated, causing a corresponding increase in the demand for sophisticated data communications services. Today's data requirements include LAN Interconnection, screen sharing, Group IV facsimile, 7.5 KHz wideband audio or high-grade audio, disaster recovery, and video conferencing capabilities.

LAN Interconnection gives business a way to link together several LAN sites. Industries—such as banking, insurance, health care, and others—have come to rely extensively on their LAN networks to support day-to-day business transactions. As the number of LAN installations increases, MIS managers are using LAN interconnection to create a seamless corporate-wide data network.

Multilocation Screen Sharing can be used by organizations with branch facilities to cut costs, increase productivity, and improve coordination of activities. Screen sharing allows users at different locations to view and alter the same file on their PCs. Through ISDN, voice and data can run simultaneously on the same line. For example, managers at head offices can review reports with regional representatives. Loan officers and real estate agents at different sites can review documents required for loan approvals. Legislators holding a committee meeting by conference call can examine proposed bills on computer screens and observe revisions immediately.

Group IV Fax provides a high-resolution image that can be switched inexpensively over the public telephone network at speeds up to 64 kbps—one page in three seconds. Group IV facsimile machines, which use laser printing to produce high-quality images, can cut equipment costs by 25 percent compared to conventional computers.

With this ability, engineers and designers can send detailed schematics to distant manufacturing plants. Professors and

students can transmit materials to colleagues. Sales representatives in the field can respond to customer inquiries quickly with detailed product information, including half-tone photographs and high-resolution drawings. Physicians can exchange and discuss patient records.

A dramatic testament to the quality of Group IV fax is its use by law enforcement agencies to distribute fingerprints and photographs of missing children, and known or suspected criminals. With the broadcast feature on some machines, such as the NEC BIT-IV fax machine, as many as 10 groups—each containing 200 recipients—can be sent documents at the same time. While in the confidential mode, the document can only be printed when a user enters the correct password.

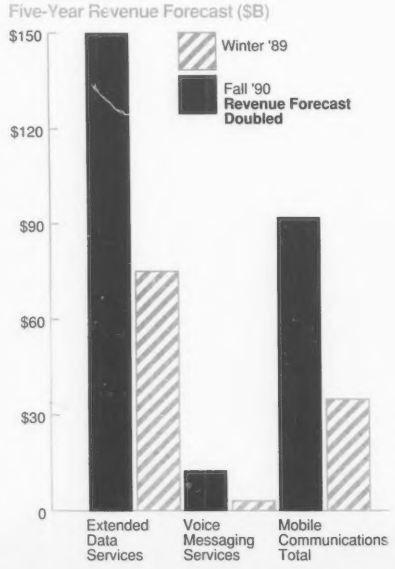
High-Grade Audio allows users to obtain broadcast-quality sound through a dial-up, digital connection. In the past, radio stations relied on dedicated lines or satellite transmissions, which are more expensive and lack the flexibility of the public network link.

This advanced technology enables radio correspondents in the field to file reports with broadcast-quality sound, easily and quickly. Micro[56]—a microcomputer audio compression device that fits into a briefcase and is made by Corporate Computer Systems—converts the analog audio signal into a digital data stream at the sending point. A companion microcomputer reconstructs the audio signaling at the receiving end. This data technology allows individual radio or television stations to supply voice programming to the network quickly and economically through dial-up digital audio.

Disaster Recovery is a process that offers a critical backup option for businesses involved in vital transfer of information, such as banking or financial institutions. A data line from the telephone operating company can provide a flexible, economic means of supplying backup circuits in case dedicated lines are lost. With Automatic Disaster Recovery, an intelligent A/B switch monitors the dedicated circuit and automatically switches service to the public network when a dedicated connection is broken.

Video Conferencing saves businesses time and travel costs. Dial-up Video Conferencing, through the public network, offers the additional savings made possible by using central office lines instead of private or leased DS-1 circuits.

With this capability, corporate training courses can be offered to regional offices, businesses can conduct interviews at college campuses, real estate agents can provide a client a video tour of a home located in a distant city, or a witness can testify or give a deposition.



Data's Newest Technology: Frame Relay

Frame relay is a wide-area packet switching technology that provides performance equal to dedicated private-line networks, but does so more efficiently.

Technology. Frame relay's rapid and efficient method of data transport assures reliable delivery and substantial performance improvement compared to current LAN interconnect solutions. The 1.5 Mbps bandwidth handles the average 1 Mbps LAN speed, and can easily accommodate bursts up to 10 Mbps. Frame relay uses statistical multiplexing, which provides dynamic bandwidth for handling the "bursty" nature of LAN traffic.

According to Terry Sweeney, *Communications Week's* Public Networking Editor, "Frame relay is viewed by network planners and switch buyers as an important logical step in public-network evolution." Nick Lippis, a principle consultant with Northeast Consulting Resources, concurs, "Carriers have been looking for a way out of the high-expense, low-profit [circuit-switched] private-line business and into true bandwidth-on-demand services."

The technology provides a common transport service for all LANs and allows MIS departments to establish a single interface architecture for a corporation. In addition, frame relay significantly improves information concerning volume and usage patterns on traffic flowing onto the LAN.

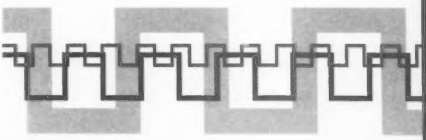
The Alliance. To ensure compatibility between public and private networks, four key manufacturers—cisco Systems, StrataCom, Digital Equipment Corporation, and Northern Telecom—have agreed to a common user-network interface specification.

Steve Sazegari, an analyst with Dataquest Inc., says, "This is a powerful alliance that will set a de facto standard. This team-up is telling telephone companies and users that the whole network will support frame relay." According to Berge Ayvazian, an analyst with the Yankee Group, "This alliance helps accelerate the introduction of frame relay services both at the central office and at the premises. This creates potential for a hybrid [network], where it was ambiguous before if the public and private pieces would be compatible."

Events since the announcement of the consortium in September bear this out with 24 more network interface vendors joining the group. This consortium represents a powerful influence in today's communications industry.

By installing frame relay circuit packs with the appropriate software, the telephone operating company can offer a high-performance, high-speed LAN interconnect service. This provides a powerful data networking strategy for distributed data networks and enables the telephone operating company to offer effective data solutions.

With frame relay, options for business are expanded. John Shaw, staff director for data services, NYNEX Service Co., says, "Frame relay is important in that it can address a broader, more near-term market." Shaw points out that frame relay makes the public network a viable, present-day alternative to expensive private solutions.



Northern Telecom's DMS Data Services Offering

Northern Telecom's DMS Data services portfolio, delivered through the public network, offers central-office reliability, along with the flexibility of multiple technologies and access techniques that complement in-place systems. The services in the DMS Portfolio interwork completely, and deliver connectivity for desktop LANs.

The high-speed transmission of the DMS Data technologies over both dialable and dedicated lines moves data at speeds up to 64 kbps synchronous and 19.2 kbps asynchronous. DIALAN and ISDN allow voice and data transmission over single, twisted-pair wiring.

DMS Data solutions are effective alternatives to transmitting data over expensive coaxial cable, private leased digital lines, or less reliable analog modem communications. DMS Data will evolve with central office technology to function in ISDN environments, offering frame relay and Dialable T1 capabilities.

DIALAN (DMS Integrated Access Local Area Network) provides the user the ability to transmit data over a standard telephone line while talking on that same line, using DIALAN software and replacing a standard modem with an Integrated Voice and Data Module (IVDM). With DIALAN, data travels over a telephone line at speeds up to 19.2 kbps synchronous and asynchronous—16 times faster than 1200 baud (1200 bps) modems. The time required to transmit a 40-page document, for example, drops from 20 minutes to 1:15 seconds.

Multilocation screen sharing and LAN interconnection are also possible on the public network through DIALAN technology.

DIALAN supports the same popular communication packages—such as Smartcom, Procomm, Crosstalk, MacTerminal, PC Anywhere, and Carbon Copy—that are used with modems, and offers high-speed PC-to-PC file transfer. This addresses the increasing demand for networking by providing asynchronous PC-to-PC file transfer and PC-to-host access.

Datapath offers direct digital data communications over twisted pair wiring between the user's desktop computer and a DMS-100 Family central office host switch, which gives users a clear, digital path through the network. The result is a cost-effective network using existing voice network wiring for data transmission.

Datapath services also can be deployed in a non-DMS-100 office by installing Datapath extension cards in channel banks or SLC-96s.

The Datapath terminals connect to the network through standard wall jacks, eliminating the need for expensive coaxial cable, while providing an easy and cost-effective way to increase terminal applications. Also, Datapath provides high-grade audio, dial-up compressed video conferencing, Group IV fax capabilities, disaster recovery, and LAN Bridging for Ethernet, Appletalk, and Token Ring LANs.

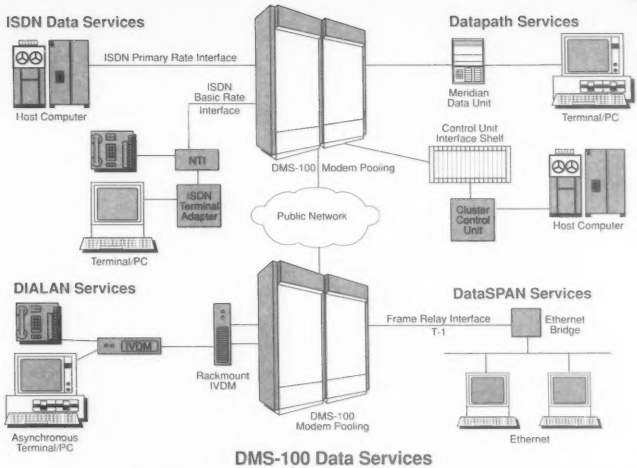
Analog facilities in the data connection present no problem for Datapath. Modem pools located in the telephone switching centers provide cost-effective analog-to-digital conversion between Datapath access lines and modem-based applications.

A Datapath connection offers a range of transmission speeds:

- 300 bps to 19.2 kbps—provides asynchronous end-to-end digital transmission capabilities; and
- 1.2 kbps through 19.2 kbps and 48, 56, or 64 kbps—provide clean, synchronous transmission, at prices often less expensive than other technologies.

Northern Telecom's ISDN is standards compliant, operating to a set of CCITT-defined (International Consultive Committee for Telephone and Telegraph) interfaces and protocols. ISDN is a unified, all-digital communications network that allows single-plug access for exchanging voice, data, video, and image information. With Northern Telecom's DMS multiplex switching, data can be circuit- and packet-switched at speeds up to 64 kbps.

A Basic Rate Interface twisted pair loop can support up to eight ISDN terminals, two of



DMS-100 Data Services

which can be voice. Through Primary Rate Interface links, used mainly for trunking, customer premises equipment—such as a private branch exchange, a LAN gateway, or a host computer—can be connected to the public switched network.

Northern Telecom's ISDN can provide all the capabilities that are supported by DIALAN and Datapath, such as screen sharing, LAN interconnection, Group IV fax, disaster recovery, compressed video conferencing, and high-grade audio capabilities.

The Future. DataSPAN, a new DMS SuperNode "fast packet" service based on frame relay standards recommended by the CCITT and the American National Standards Institute, is the ideal service for the emerging high-speed LAN interconnection market. DataSPAN provides end-users with up to 1.5 Mbps bandwidth for high-speed data communications.

Prior to DataSPAN, corporations faced with connecting several data sites usually chose to lease fixed-bandwidth, dedicated lines. However, with DataSPAN, a data site can be connected with all other sites through a single access line to the frame relay network. DataSPAN also offers dynamic allocation of bandwidth, or bandwidth-on-demand. This eliminates the necessity for an expensive high bandwidth leased line to every other site to meet the needs of a few large transactions.

DataSPAN is accessed through switched 56 kbps services (Datapath), ISDN "B" channels, channelized or non-channelized T1 lines, or private lines. Services made possible by DataSPAN include:

- LAN Interconnection Service—this bridges or interconnects similar types of LANs over a wide area, making them function as a single large LAN.
- SNA Connectivity Services—now IBM connects their products using modems and private lines in a system known as System Network Architecture (SNA); with SNA Connectivity Services, IBM customers can build high-performance virtual private networks to replace the low-performance, multi-drop networks.

DataSPAN is scheduled for trial in early 1991, with commercial availability by the end of 1991.

Dialable T1 (PRI). Dialable T1 extends the coverage of plain old telephone service to wideband access facilities. The end-user can dial-up a wideband facility and use it for applications such as on-demand video conferencing, high-speed file transfer, or LAN interconnect. The call is similar to dialing normal voice calls except the end user will specify the number of channels/bandwidth.

The control interface for Dialable T1 is by way of Q.931 signaling through Primary Rate Interface ISDN, which allows the service to be used in conjunction with the growing base of Primary Rate ISDN customer premises equipment.

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INSIGHT is a special publication of
Connections magazine

57126.11/1-91
Printed in USA

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EXECUTIVE CORNER

Maxtor goes on CEO search

Maxtor Corp. founder and Chairman **James M. McCoy** last week stepped back into his former job as president and chief executive officer of the San Jose, Calif.-based disk-drive company. He replaces **George M. Scalise**, who resigned for personal reasons, while the company searches for a permanent successor, according to Maxtor.

Effective this month, **Brian Lacey** is the new president and CEO of Billerica, Mass.-based **Atex Publishing Systems**, an **Eastman Kodak Co.** subsidiary. Lacey, a former high-tech consultant and corporate executive with a turnaround track record both in the U.S. and abroad, will spearhead a restructuring aimed at boosting Atex's stance in the electronic publishing systems market, the company said. He succeeds acting President **John LeTourneau**, who will return to the chief financial officer's post he held before stepping into the breach during Atex's executive search.

Computer industry veteran executive **James D. Norrod**, most recently a venture capitalist at Palo Alto, Calif.-based Merrill Packard Anderson and Eyre, took on the top position at another computer company last week: San Diego-based storage management software vendor **Emerald Systems Corp.**

Bridge/router products vendor **Advanced Computer Communications** appointed **Ossama Hassanein** president and CEO earlier this month. Hassanein, a Northern Telecom, Inc. veteran, has served on Advanced Computer Communications' board of directors since 1987. That year, the firm's founder and Chairman Roland F. Bryan noted, marked the start of Advanced Computer Communications' diversification from defense communications into internetworking — a move in which Hassanein was influential.

Earlier this month, Rolm Corp. veteran **Anthony V. Carollo** became executive vice president and chief operating officer of **Fujitsu Business Communication Systems**, a **Fujitsu America, Inc.** subsidiary headquartered in Phoenix. In his new position, Carollo will be charged with implementing Fujitsu Business Communication's telecommunication strategy. He will also be reunited with an old colleague: former Rolm vice president and current Fujitsu Business Communication Vice President of Sales Larry Jernigan, who joined the firm last fall.

San Francisco-based **Bank of America** this month named former International Private Banking head **Thomas M. Quigg** to head up its U.S. division's High Technology Group. A "high-tech bank since the industry's beginnings" according to Executive Vice President R. Thomas Decker, the bank views Quigg's new assignment as an emblem of its commitment to expanding its technology industry presence. Quigg will be responsible for credit and marketing activities targeted at high-technology businesses, the bank said.

Zenith Data targets commercial

BY MICHAEL FITZGERALD
CW STAFF

Two days into his new job, Zenith Data Systems Chief Executive Officer Enrico Pesatori last week said he will make increased strength in the commercial market his "absolute" top priority at Zenith Data.

While he intends to build on strategies already in place at Zenith, Pesatori said, "I think there are many things that should be done and be improved."

Zenith Data, he said, will actively pursue strategic and technical alliances with other vendors as part of refocusing its product line strategy. In addition, Pesatori said he intends to see the company accelerate what he called a "rapid" expansion of its market share, especially in Europe. "The commitment and financial resources of [Zenith Data's French parent company] Groupe Bull," Pesatori noted, will be a significant asset on which to rely.

Recent shifts in the firm's sales strategy will hopefully be helpful as well. In a letter circulated to employees outlining the shift, Vice President of Sales and Marketing Arthur Lambert said the company will move from its regional sales strategy to a two-channel approach focused on sales in the commercial and education/state government areas. Zenith Data's government sales force is unaffected by the change, which will result in the layoff of 50 salespeople and possible cuts in support staff as well.

Computer firms continue to post fourth-quarter earnings

Microsoft exceeded expectations, Picturetel boomed, Silicon Graphics got tough and Stratus hung on as fourth-quarter computer industry earnings reports showed some bright spots in turbulent times

Company	Revenue Oct. through Dec.	Percent change from 1989	Net income Oct. through Dec.	Percent change from 1989
Comshare, Inc.	$33.1M	21%	$2.3M	(18%)
Cray Computer Corp.	$13M	—	$(7M)	—
Cypress Semiconductor Corp.	$63M	24%	$8.2M	1%
Legent Corp. *	$51.7M	27%	$9.7M	23%
Maxtor Corp. **	$261.1M	111%	$(3.96M)	—
Microsoft Corp.	$460.5M	53%	$112.9M	52%
Network Equipment Technologies Corp.	$35.4M	(22%)	$(5.6M)	—
Picturetel Corp.	$11.3M	99%	$.55M	69%
Silicon Graphics, Inc.	$136M	32%	$10.4M	44%
Software Publishing Corp.	$43M	43%	$6.4M	16%
Stratus Computer, Inc.	$118.5M	21%	$13.5M	32%
Tandy Corp.	$1.5B	3%	$101.1M	(14%)

Parentheses indicate a reduction or loss
* Company estimates
** Results include the operations of Maxtor Colorado Corp. (formerly Miniscribe Corp.) acquired in June 1990

CW Chart: Paul Mock

European software plan receives mixed reviews

ANALYSIS

BY EMMA WOOLACOTT
IDG NEWS SERVICE

LONDON — Industry reaction is mixed so far on the European Commission's recent compromise agreement on software protection. Under the agreement, reverse engineering will be banned if the intention is to develop, produce or market a program substantially similar to an existing product. It will be allowed, however, if the creation of a compatible system would be impossible otherwise.

The interworking issue has been a contentious one. The commission's original proposal called for a total ban on reverse engineering. Both the UK and Ireland supported it. Nevertheless, the UK Department of Trade and Industry has said it regards the more moderate version as satisfactory and is not pressing for further changes.

IBM, which has been vocal in its opposition to reverse engineering, has also said it is satisfied with the agreement, although a spokesman said the company would have preferred to see traditional copyright laws applied.

However, the European Committee for Interoperable Systems (ECIS) has reservations about the decision. Mark Deering, a partner at Adamson Wacker, the law firm representing ECIS members, called the agreement "a major victory." However, he added, ECIS has "certain problems" with it. "Third-party maintenance is not included," he said. "Systems integrators or third-party maintainers cannot maintain software because they can't run a memory dump. What does exist is error correction, but it's not sufficient from our point of view."

More problems

Another problem for ECIS is the question of the circumstances in which reverse engineering can be used to create interworking. While the preamble to the directive uses the word "product," implying that it applies to both hardware and software, the body of the text refers to the "interoperability of an independently created program with other programs." This means that, strictly speaking, the analysis of software, such as operating systems to ensure hardware compatibility, will be forbidden.

A third issue for the ECIS is the wording of the section referring to interfaces, which, Deering said, "may lead to the interpretation that interface specifications may be copyrightable."

The directive will receive a second reading before its final adoption some seven months from now, and changes are still possible. Deering said the ECIS will push for amendments that take its misgivings into account.

Woolacott writes for PC Business World, *an IDG Communications British publication.*

Interleaf

FROM PAGE 71

Interleaf software. Using hypertext, users can quickly find the needed documentation electronically without leafing through thousands of printed pages, said Emil Pavlik, a Grumman operations support manager.

"Active documents truly change the way you look at information," said Gerald Michalski, a vice president at Southport, Conn.-based market research firm New Science Associates.

However, even Interleaf officials acknowledged that hot technology is not going to turn the company around. The bigger task for Interleaf is to fundamentally change the way the company sells products. Interleaf took a $13 million write-down in 1989 to rid itself of an unprofitable hardware business that was contributing 65% of revenue but driving costs sky high.

Also gone are the firm's huge inventories and lavish spending habits: for example, the move that gave each employee, clerical staff included, a costly Unix workstation instead of a personal computer.

The company has also adopted conservative accounting practices that it said should minimize earnings surprises.

In addition to releasing several niche-oriented new products this year, Interleaf is aggressively courting value-added resellers (VAR) as a way to boost volume without increasing staff. The changes have caused turmoil in the direct sales-oriented sales force, but VAR revenue is now 8% of sales, up from 2% one year ago. Ruport said he expects VARs to eventually contribute 20% of revenue.

Interleaf is also narrowing its market focus to a few select industries, including aerospace/defense, electronics, commercial aviation, pharmaceuticals, manufacturing and utilities/telecommunications.

The company has been less successful in addressing a big strategic gap at the low end of its product line. Although it has introduced products for both the Apple Computer, Inc. Macintosh and IBM Personal Computer in the past, neither has sold well.

Interleaf will try to turn that around this summer, when it is scheduled to ship an entry-level publishing system for the PC. A Macintosh version should follow later in the fall. "We need a low-end product," Ruport acknowledged. "Long term, it's very important to our success."

Industry observers agreed. "Interleaf can position themselves as being a provider of customized solutions, but they will not grow to be $200 million doing that," said Mark Walter, associate editor of "The Seybold Report on Publishing Systems." "They're going to need a successful mass-market product."

Success story: Hunting for a skills niche

LIFE AFTER LAYOFFS

This is the conclusion of a three-part series tracking IS professionals' attempts to recover from job losses.

BY ALAN J. RYAN
CW STAFF

Being laid off with few job prospects in sight is not necessarily the end of the world or your career.

Five or 10 years ago, having any unexplained time lapse on a resume was the "kiss of death," says Jim Kwapick, director of information systems recruiting at Robert Half International, Inc. in Minneapolis. Many employers would express little interest in an employee who had been "let go" by another company, often assuming there was more behind the separation than economics.

Today, with thousands of workers displaced by layoffs throughout the nation and with more and more high-level workers having experienced layoffs at some point in their careers, prospective employers are more receptive to workers who have been laid off, Kwapick says.

"I think it is easier to gain other employment if you're employed vs. not being employed, but it is no longer the stigma that it once was to be unemployed," Kwapick says. "Everybody gets hit at some point."

That news comes as no surprise to George Francis, who was laid off by Kidder, Peabody & Co. as part of a firmwide workforce reduction after seven years at the New York company.

It has taken nearly a year for Francis to find a new job, but the wait proved worthwhile when he found himself weighing three job offers from large, nationally known firms.

While the outcome of Francis' job search was happy, the hunt itself was not easy, he says. Five months into the process, Francis admits, he became discouraged. "I thought I would find a job in three to four months," he says.

Fortunately, Kidder had provided Francis with a severance package that included outplacement services, his annual bonus and four weeks' severance pay for every year he had worked at the company.

"I didn't realize how long it would take to build the relationships and contacts necessary" to find new employment, he says, adding that those first six months went by very quickly while he worked on networking.

Initially, Francis says, he concentrated his efforts on finding a chief information officer-level position. With 30 years of experience in the computer field — from development and management to security, disaster recovery and quality improvement — he believed he had the skills required to be a successful CIO.

Francis had also completed a data center move for Kidder prior to being laid off, and he thought that experience might make prospective employers sit up and take notice. But CIO jobs are few and far between, and Francis discovered that experience in relocating a data center is a skill shared by many IS professionals.

By the time his severance expired and he was officially removed from the Kidder payroll, Francis had begun to rethink his job-hunting strategy and his own career expectations. "At that time, I realized I had a unique speciality within my 30 years of MIS experience" — bringing quality processes to the IS function, Francis says.

At Kidder, bringing in quality improvement programs was only part of Francis' duties, but he had become a strong proponent of such activity. Additionally, he had given many presentations on the topic of IS quality before members of the IBM user group Guide International. He had made many contacts in the field, and he realized that this was a specialized skill he could use to sell himself.

"I put together some literature on my approach and methodology, and I took the presentation I had made on the changing role of quality and started giving people that information along with my resume," Francis says. "And the interest in George Francis grew proportionately as a result."

Francis, who is involved in teaching a course in management decisions at New York University's graduate school, says unemployed people "have to overcome inertia, build a plan, work to it and keep the faith." Part of the plan-building can include using specialized skills the worker has acquired and seeking out a job niche that uses those skills.

"If you try to build a plan and work to it, it will come together," Francis says. "You can't just say you'll take off three weeks to go to Florida with your family — you really have to work" at finding a job.

Reinhold Spiegler

After being laid off, *Francis spent nearly one year job hunting. He was hired recently as manager of quality assurance at Computer Sciences Corp.*

Use your contacts

Networking is a big help in terms of generating job leads and friendly support. In one instance, Francis says, he met someone who had been out of a job for seven months.

"He was very disspirited. I told him to work hard but then turn it over to the man upstairs. Otherwise, you'll drive yourself to jumping out a window." The man called Francis a couple of weeks later to say he had found a job. As Francis' own job search dragged on into its seventh and eighth month, he had to remind himself what he had told the other man just two months earlier, he says.

Francis focused on his quality improvement skills and continued his search. He finally accepted a position as the manager of quality assurance at Computer Sciences Corp.'s Communications and Integration Services Division in Piscataway, N.J.

Ryan is a *Computerworld* features senior writer.

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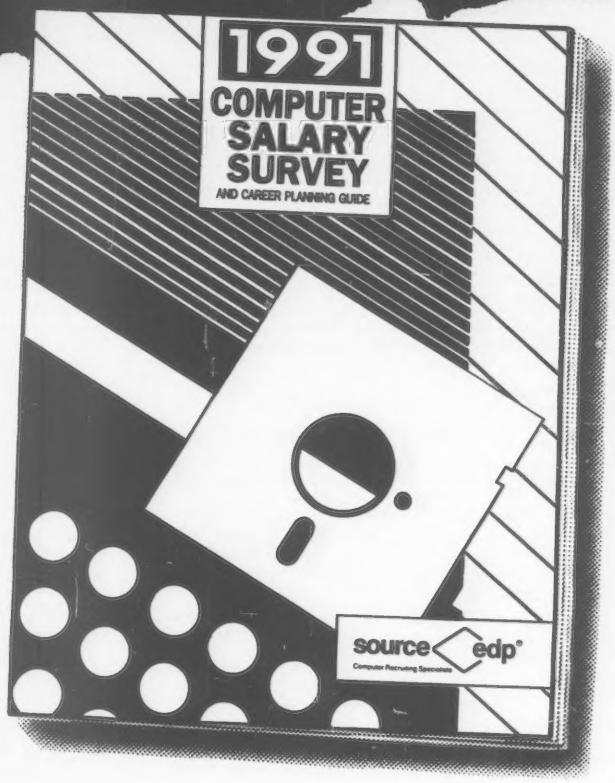

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You will be responsible for providing technical training, research and microcomputer-based solutions to business problems. You must have a BS in Engineering, a technical or business field (MS preferred) and a minimum of 10 years experience in microcomputer technology (applications development preferred). You should also be a CNE (Certified Network Engineer) or have previous mainframe experience on either the VAX or IBM Host platforms. Experience developing, supporting or implementing a microcomputer-based training program is also essential. Familiarity with other network environments such as Token Ring and Ethernet is desired, and knowledge of CAD, CAM, CAE technology and/or UNIX-based workstations would be helpful.

SYSTEMS MANAGER, PROJECT CONTROL SYSTEMS

You will be responsible for the identification of Project Control Systems requirements, the formulation of systems solutions, developing cost schedules and technical implementation plans for solutions, as well as final delivery of the product. Requires a BS in a technical or business related field and a minimum of 10-15 years of systems management and implementation experience. Your background must also include the successful implementation of a project control system in an IBM Host or VAX environment. Previous supervisory and project management experience is essential.

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SYSTEMS ANALYST wanted. Duties: Redesigning the systems architecture for a distributed object oriented database management system for automotive manufacturing quality control purposes using C language. Includes meeting with user management and electronic data processing personnel to analyze the requirements, participating in the development of specifications, then applying database design and analysis principals to the system architecture problems. Need a Bachelor's degree in Computer Science or Engg. and six mos. exp. as a computer Programmer. Must have 1 univ course in quality control and must have at least one semester of independent research pertaining to the development of the architecture for a distributed object oriented data management system using C language. Pay is $30,000/yr. 40 hr/wk. Resumes to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref. #89590. Employer Paid Ad.

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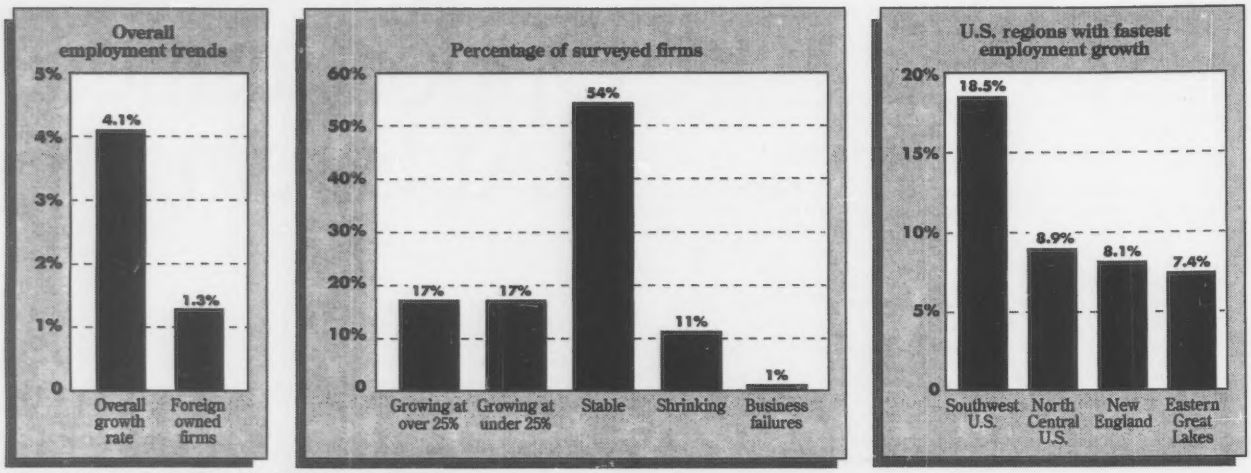

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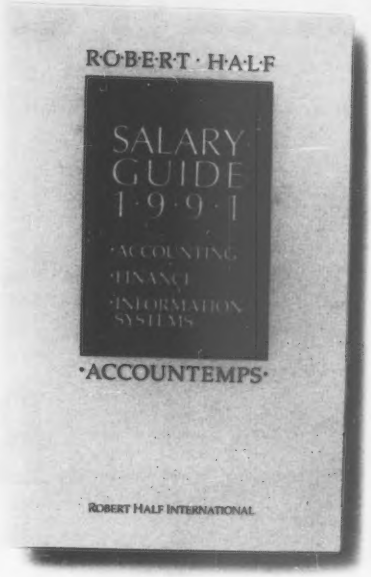

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MARKETPLACE

Managers not rocking the IS spending boat

Internal cutbacks are becoming more common

BY CONNIE WINKLER
SPECIAL TO CW

Now that we're in a recession, information systems managers are going to be more aggressive in their equipment purchasing strategies, fighting harder to get the best deal. Right?

Wrong. Based on the comments of several IS managers at major companies, economic conditions are not causing dramatic changes in their purchasing patterns.

"Our demands for processing far overshadow momentary opportunities," the top computer financier at a giant oil company says even as he acknowledges that these days are especially volatile for oil producers in light of the Persian Gulf war.

Simply because of its size and that it is running five IBM mainframes, this Houston company is not going to shake up its lease/purchase mix of hardware despite the fact that it may get a better deal in today's economy.

In fact, rather than looking in the market for ways to cut costs, many IS managers are focusing on cutting costs internally to survive the crunch.

Limited spending

For example, at Dow Jones News/Retrieval service in South Brunswick, N.J., a freeze on capital expenditures and salary increases prompted more limited IS spending; the company is proceeding only with projects and capital expenditures "critical to new revenue streams," says Richard Levine, vice president and editorial director of the IS group. For instance, IS will continue to enhance the front-end user accesses to its successful full-text news retrieval and search services.

While many companies are just struggling with cost reductions, Denver-based United Banks of Colorado has been fighting Colorado's oil and real estate recession for the past five or six years. "We've been in a severe recession; there's been an awful lot of pressure for cost control," says Richard S. Watt, president and chief executive officer of United Banks Service Co., the operations arm of the $6 billion United Banks.

In 1990, Watt's group kept costs only 3% higher than they were in 1986, while the internal IS services business grew 25%.

One way United Banks was able to keep costs so low was by enhancing existing equipment rather than buying state-of-the-art personal computers.

"In a recession environment, there was no way we could justify the added features and functionality of PCs at $8,000 to $10,000 per employee," says Watt, noting that those estimates included training and support.

According to plan

United Banks' hang-tough, stick-to-their-knitting strategy apparently worked: Last year, Norwest Bank Corp. in Minneapolis, which was looking to expand, acquired United Banks. And the Colorado economy seems to be improving in small steps.

Likewise, Pepsico, Inc. is ready for the recession after tailoring its operations four years ago to adjust to a tighter economy. The IS operations that grew out of the rethinking are now poised to support the company in a more competitive marketplace.

For example, Pepsico downsized applications from mainframes to PCs to provide more processing control at the departmental level at lower cost.

With the recession in full swing, the changes are paying off: The beverage and food company is now prepared to handle tightened consumer spending in 1991 that could prompt consumers to switch from expensive restaurants to Pepsico-owned Pizza Hut, Taco Bell or Kentucky Fried Chicken fast-food chains.

"Over the last three or four years, we've taken steps across the enterprise to trim things down before we had to," says Bill Dean, director of management technology services at Pepsico's Purchase, N.Y.-based headquarters.

Gaining an edge

Dean also cites Pepsico subsidiary Frito-Lay, Inc. as another example of rethinking systems to gain an edge in the marketplace. At Frito-Lay, route sales representatives now carry handheld computers storing precise inventory and sales figures. The latest figures are sent back to regional offices each night so the corn chip and potato chip producer can quickly respond to changes in consumers' tastebuds or sales declines with cents-off specials or other incentives.

RATHER THAN LOOKING in the market for ways to cut costs, many IS managers are focusing on cutting costs internally to survive the crunch.

Other IS managers are trying to work within changes mandated by senior management. For example, Amax Coal in Indianapolis is undertaking a corporatewide decentralization that includes all computer operations. The systems changes primarily involve moving applications off the mainframe, says Joseph Rosio, director of IS.

Approximately one dozen operations sites and three regional offices are being equipped with PCs, networks and minicomputers. To save on communications costs, Amax recently replaced older modems and multiplexers with new technology from AT&T, Rosio says.

Winkler is a free-lance writer based in Seattle.

The BoCoEx index on used computers

Closing prices report for the week ending January 18, 1991

	Closing price	Recent high	Recent low
IBM PC Model 176	$300	$450	$200
XT Model 086	$500	$550	$450
XT Model 089	$550	$625	$400
AT Model 099	$650	$975	$500
AT Model 239	$775	$1,025	$700
AT Model 339	$925	$1,100	$900
PS/2 Model 30-286	$1,100	$1,300	$1,025
PS/2 Model 60	$1,500	$1,800	$1,400
PS/2 Model 70P	$3,000	$3,500	$2,500
Compaq Portable II	$900	$1,050	$875
Portable 286	$1,100	$1,450	$1,000
SLT 286	$2,300	$2,500	$2,000
Portable 386	$2,500	$2,800	$2,200
LTE 286	$2,300	$2,500	$2,000
Deskpro 286	$800	$1,000	$700
Deskpro 386/20	$2,900	$3,100	$2,400
Apple Macintosh Plus	$750	$975	$700
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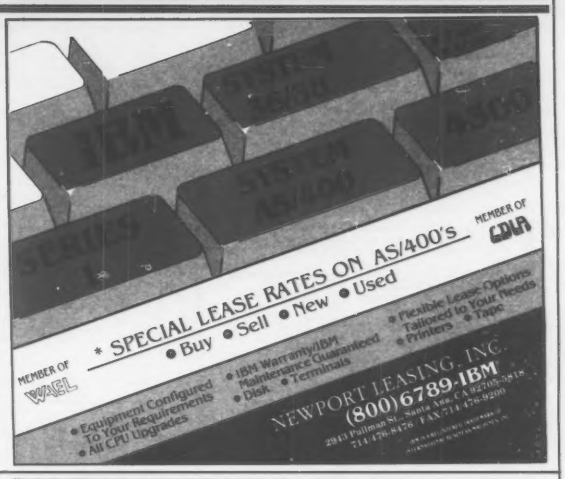

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Winning the fight over budget restrictions

Second in a two-part series

BY ALICE LAPLANTE
SPECIAL TO CW

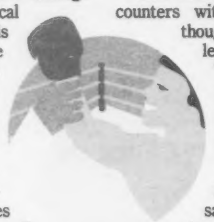
When it comes to training end users, many information systems managers have a problem: justifying or somehow quantifying the effect of money spent on classroom, interactive video or computer-based training.

However, some IS trainers and managers have successfully answered the demand for cost justification. While these problem solvers say there are no cut-and-dried methods to measure the effectiveness of training, they use several tactics to get around this:

- Developing partnerships with managers and end users.
- Using surveys and evaluation forms to assess training effectiveness.
- Pointing out ways that training can save the company money.
- Implementing certification programs and measuring user performance in jobs after the training period has ended.

For Michael Mazen, manager of professional training and development at Policy Management Systems Corp., a Columbia, S.C., insurance software systems maker, justifying training is more difficult than for most managers. His company classifies training in two categories: strategic and tactical — so he has two groups in which to justify the costs of training.

Strategic training at Mazen's firm comprises those classes that corporate senior management deem essential for the long-range survival of the firm: introduction to insurance industry concepts, a customer-relations skills class and a quality-control management course. Tactical training, however, is made up of those courses that focus on goals relating to the day-to-day systems tasks of end users.



Because the firm's training department operates as a profit center, all training is provided on a charge-back basis, Mazen says. Strategic training is paid for by the corporation; tactical training is funded by the individual departments. Mazen has watched strategic training dollars go from 95% of his total budget to only 50%. And he expects that will decrease even further in coming years. This shift in funding means more than half of the funds his department receives are voluntary expenditures, and to continue getting those funds, he must make sure the training is cost-effective.

The best way to go about that task, he says, is through a partnership approach: contacting the trainee's manager and asking for feedback on the courses.

"I spend a lot of time with both the sponsoring managers and the end users, asking them how our core curriculum could be improved," Mazen says.

One of the problems he encounters with this approach, though, is little time and lean resources: "With current staffing, I only have so many hours in a day," Mazen says.

Other trainers have run into the same problem, and the condition of the economy isn't helping matters. "We don't have the resources to do a lot of quantitative testing," says David Stanfield, manager of the MIS education center at Glaxo, Inc., a pharmaceutical manufacturer located in Durham, N.C. His staff is very small, and he relies on independent contractors to deliver much of the coursework.

Because of a shortage of funds to collect quantitative data, many training managers find themselves increasingly dependent on surveys and evaluation forms from employees.

Another way to justify the cost of educating end users is by showing the cost of *not* training, says David Podeszwa, manager of the education department at Johnson Controls, Inc. in Milwaukee.

"I tell them to try and estimate the lost sales that occur when employees mishandle customers," says Podeszwa, who trains employees and customers of Johnson Controls, which develops computer-based management systems.

While concrete measurements are difficult to develop, some trainers still try to quantify the value of training. For example, Linda Starkey, the information center director for North Carolina's Wake County, recommends certification programs that rank employees based on their ability to operate at different levels of computer expertise. "For example, the level 1 office support curriculum would include an introduction to word processing and spreadsheets; level 2 could be the preliminary spreadsheet curriculum and so on," she says.

According to Starkey, certification has two purposes: It gives users a concrete idea of exactly what their skill level is in a given area, and it looks impressive in a management report. For example, a training or IS manager can summarize data for the month or the year to show management inroads in teaching end users valuable computing skills.

The end results

The single best evaluator of training is whether you can measure a difference in how people perform their daily tasks. Can a secretary produce more letters with fewer mistakes? Can a clerk process more orders? Can a salesperson sell more?

"Some people measure how effective computerized sales training is by the number of sales calls made or prospect letters mailed," says Kenneth Kousky, chairman at Wave Technologies Training, Inc. in St. Louis, a training consulting firm. "But the true measure is this: Are they selling more? Or, conversely, are their costs lower? Those are really the only measures you should be concerned about."

However, while several techniques are available and appear to be at least somewhat successful in justifying training, it's not yet a perfect world. Without the involvement of business managers, evaluation of end-user training will continue to be difficult.

"This is a partnership," Kousky says. "It cannot be driven by the technology side alone."

LaPlante is a free-lance writer based in Palo Alto, Calif.

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INDUSTRY ALMANAC

RECOMMENDATION CHANGES

UPGRADED FROM UNATTRACTIVE TO NEUTRAL: **Lotus Development Corp.** (by Donaldson, Lufkin & Jenrette, Inc.). Reason: Although it missed the initial Microsoft Corp. Windows surge, Lotus will challenge Microsoft in the long run.

DOWNGRADED FROM BUY TO HOLD: **Microsoft** (by Prudential-Bache Securities, Inc.). Reason: Stock price has gained almost 25% since mid-November; current price/earnings ratio is too high.

DOWNGRADED FROM ATTRACTIVE TO NEUTRAL: **AST Research, Inc.** (by Paine Webber, Inc.). Reason: Competitor Advanced Logic Research, Inc. is now a better short-term investment value; AST shares have more than doubled since March 1990.

DOWNGRADED FROM BUY TO ATTRACTIVE: **Advanced Logic Research** (by Paine Webber). Reason: Aggressively priced notebook and personal computers are expected to sell well, but stock is overvalued.

GUEST SPEAKER

Erik Jansen, Robertson, Stephens & Co., San Francisco:

"**Cypress Semiconductor Corp.** supplies all the core pieces of Scalable Processor Architecture (Sparc)-based microcomputers. Its Sparc business went through the roof in December, as its earnings indicated last week. Cypress will grow very strongly in the next two quarters."

"**Texas Instruments, Inc.** might compete for future Sparc business, but it's struggling now. The market demands specialty companies that make niche products, such as **Dallas Semiconductor Corp.**, which invents product areas that never existed before. It created a market for the components that go into the clock function in a microcomputer, and now it dominates that area."

ANALYSIS IN BRIEF

Computer hardware stocks have recovered from the slide begun in June 1990, but current negative secular and seasonal forces will worsen the industry's three-year revenue slowdown. Take advantage of the recent rally by selling technology stocks now.

For the long term, **IBM** is a good buy because of its market-share gains and expense controls. **Teradata Corp.** is a higher risk but worth a look because of its relationships with **AT&T** and **NCR Corp.** AT&T is Teradata's biggest customer, while NCR owns nearly a 10% stake in the company. — *Computers: Danger Ahead, UBS Securities, Inc., Jan. 10, 1991.*

Hold PC and midrange hardware stocks, as we are shaving earnings estimates for the current period. Expect further reductions if the U.S. economy continues to weaken. Most firms should show positive currency translations from foreign sales but not as favorable as those gleaned this time last year.

The only company in this sector rated an outright "sell" is **Unisys Corp.**, which will likely show a big loss for the fourth quarter of 1990. — *Computers: Earnings Preview, Prudential-Bache, Jan. 16, 1991.*

KIM S. NASH

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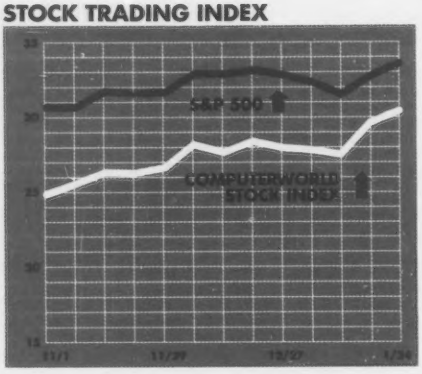


THIS WEEK'S HIGHLIGHTS

- Technology stocks continued to surge last week as news of quarterly earnings spread. Data General Corp. jumped 4 points, closing Thursday at 8¼ after posting a surprisingly profitable first quarter.
- Microsoft Corp. also gained on news of bigger profits, adding 5¼ points to 90½, a new high. Borland International, Inc. topped its recent high, reaching 43¼ Thursday, up 5⅞ points.
- Although Alex. Brown & Sons, Inc. downgraded Oracle Systems Corp. to "Market Underperformer," citing uncertain near-term cash flow, Oracle advanced 1⅛ points to 6¾.
- AT&T's fourth quarter profits slipped, and its stock fell ½ of a point to close at 30⅞. MCI Communications Corp., which recently hit a new low, inched up ⅝ of a point to 20⅝.
- While Amdahl Corp.'s quarterly earnings were up, its share price was not, dropping to 14, down ⅝ of a point.

Computerworld Stock Trading Summary

CLOSING PRICES JAN. 24, 1991

TOP PERCENT GAINERS

Computer Auto. Inc.	125.00
Data General Corp.	88.57
Interleaf Inc.	55.56
Corporate Software	50.00
Artel Comm. Corp.	45.45

TOP PERCENT LOSERS

Network Equipment Tech.	-28.89
Iomega Corp.	-20.45
Infotron Systems Corp.	-18.70
Selecterm Inc.	-18.18
Comshare Inc.	-17.19

TOP DOLLAR GAINERS

Microsoft Corp.	6.50
Digital Equipment	6.00
IPL Systems Inc.	5.75
IBM	5.25
Motorola Inc.	5.00

TOP DOLLAR LOSERS

Software Publishing Corp.	-4.13
Bell Atlantic Corp.	-4.13
3M Corp	-4.00
Pacific Telesis Group	-3.13
Computer Sciences	-3.13

Exch	52-Week		Range	Jan. 24 Close	Wk Net Change	Wk Pct Change
Communications and Network Services					**Up 1.32%**	
OTC	19.00	5.38	3 COM Corp.	7.63	1.63	27.08
NYS	69.75	52.50	American Info Techs Corp.	64.13	-1.75	-2.66
NYS	44.13	29.00	AT&T	30.88	-0.38	-1.20
OTC	9.63	0.88	Artel Communication Corp.	2.00	0.63	45.45
NYS	56.25	39.50	Bell Atlantic Corp.	48.13	-4.13	-7.89
NYS	57.63	49.00	Bellsouth Corp.	52.00	-1.38	-2.58
OTC	16.38	8.25	Compression Labs Inc.	13.00	1.13	9.47
NYS	36.75	23.38	Contel Corp.	34.75	-1.38	-3.81
OTC	4.38	1.75	Data Switch Corp.	4.13	0.13	3.13
NYS	26.75	8.88	Digital Comm. Assoc.	13.00	0.00	0.00
OTC	20.50	12.25	Dynatech Corp.	19.38	0.13	0.65
OTC	12.88	5.50	Fibronix Int'l Inc.	8.00	0.38	4.92
OTC	4.00	1.75	Gandalf Technologies Inc.	2.69	0.19	7.52
NYS	4.75	1.63	General Datacomm Inds.	2.13	-0.13	-5.56
NYS	34.13	23.50	GTE Corp.	28.13	-1.50	-5.06
OTC	7.00	0.81	Infotron Systems Corp.	0.81	-0.19	-18.70
NYS	60.88	40.25	ITT Corp.	50.00	1.75	3.63
OTC	44.13	17.88	MCI Commmunications Corp.	20.63	0.75	3.77
OTC	21.00	2.75	Microcom Inc.	3.50	-0.25	-6.67
NYS	34.38	4.00	Network Equipment Tech.	4.00	-1.63	-28.89
OTC	14.63	4.00	Network General	10.00	1.50	17.65
OTC	15.25	8.00	Network Systems Corp.	13.13	0.00	0.00
NYS	29.63	22.13	Northern Telecom Ltd.	26.63	-1.00	-3.62
OTC	39.25	14.25	Novell Inc.	38.38	0.50	1.32
NYS	89.50	67.13	Nynex Corp.	68.50	-1.50	-2.14
NYS	47.88	36.25	Pacific Telesis Group	39.88	-3.13	-7.27
ASE	10.13	4.75	Penril Corp.	10.13	1.25	14.08
NYS	29.13	8.88	Scientific Atlantic Inc.	12.88	0.50	4.04
NYS	59.50	47.25	Southwestern Bell Corp.	51.00	-2.38	-4.45
NYS	46.38	20.63	United Telecom	22.25	-0.13	-0.56
NYS	40.50	32.38	US West Inc.	36.13	-0.75	-2.03
Computer Systems					**Up 12.16%**	
OTC	8.75	0.56	Alliant Computer Sys.	1.00	0.00	0.00
ASE	18.88	10.00	Amdahl Corp.	14.00	-0.25	-1.75
OTC	52.75	24.25	Apple Computer Inc.	52.13	0.88	1.71
OTC	13.88	4.25	Archive Corp.	6.63	0.13	1.92
NYS	6.63	3.88	Bolt, Beranek & Newman	6.25	1.25	25.00
NYS	13.63	4.50	Commodore Int'l	13.63	2.38	21.11
NYS	67.88	35.50	Compaq Computer Corp.	61.50	-1.75	-2.77
OTC	4.25	0.13	Computer Automation Inc.	1.13	0.63	125.00
NYS	21.63	8.75	Control Data Corp.	9.38	0.63	7.14
NYS	20.88	8.38	Convex Computer	13.00	1.25	10.64
NYS	51.25	20.00	Cray Research Inc.	37.50	2.25	6.38
NYS	13.25	3.50	Data General Corp.	8.25	3.88	88.57
NYS	3.88	0.75	Datapoint Corp.	1.88	0.25	15.38
OTC	22.63	4.63	Dell Computer Corp.	22.63	2.25	11.04
NYS	95.13	45.50	Digital Equipment Corp.	67.50	6.00	9.76
NYS	36.13	13.75	Harris Corp.	21.00	0.75	3.70
NYS	50.38	24.88	Hewlett Packard Co.	36.50	1.00	2.82
NYS	123.13	95.50	IBM	121.00	5.25	4.54
OTC	14.00	7.75	Information Int'l	7.75	-0.25	-3.13
OTC	23.50	10.50	Intergraph	16.50	1.63	10.92
NYS	3.88	0.88	MAI Basic Four Inc.	1.00	0.00	0.00
NYS	160.88	114.00	Matsushita Electronics	124.63	-1.88	-1.48
OTC	28.00	9.00	Mentor Graphics Corp.	15.75	1.75	12.50
NYS	92.88	44.50	NCR Corp.	88.13	1.50	1.73
OTC	35.50	11.00	Pyramid Technology	16.75	2.88	20.72
OTC	34.00	9.75	Sequent Computer Sys.	13.75	1.75	14.58
NYS	40.88	18.00	Silicon Graphics	29.13	2.00	7.37
NYS	29.00	14.63	Stratus Computer Inc.	25.00	1.50	6.38
OTC	37.25	15.00	Sun Microsystems Inc.	27.88	1.63	6.19
NYS	30.13	8.88	Tandem Computers Inc.	12.38	1.75	16.47
NYS	39.50	23.50	Tandy Corp.	27.75	-0.38	-1.33
OTC	36.50	8.75	Teradata	13.75	1.50	12.24
NYS	9.00	1.38	Ultimate Corp.	1.88	-0.13	-6.25
NYS	17.13	1.75	Unisys Corp.	2.63	-0.13	-4.55
ASE	6.25	2.00	Wang Labs Inc. (b)	2.88	0.38	15.00
Software & DP Services					**Up 7.31%**	
OTC	50.75	17.00	Adobe Systems Inc.	35.88	2.38	7.09
OTC	36.50	16.50	Aldus Corp.	35.25	2.25	6.82
OTC	19.88	10.50	American Mgmt. Systems	19.88	1.63	8.90
OTC	18.25	7.50	American Software Inc.	14.75	0.25	1.72
NYS	4.50	1.38	Analcomp Inc.	2.13	0.00	0.00
OTC	23.50	10.00	Analysts Int'l	13.25	0.00	0.00
OTC	15.13	4.88	Ashton Tate	5.63	-0.25	-4.26
OTC	10.25	4.00	ASK Computer Sys.	5.25	0.50	10.53
OTC	60.25	45.25	Auto Data Processing	56.75	2.25	4.13
OTC	60.25	32.00	Autodesk Inc.	52.00	2.13	4.26
OTC	25.50	12.00	BGS Systems Inc.	21.50	1.00	4.88
OTC	36.00	17.75	BMC Software Inc.	36.00	2.13	6.27
OTC	21.50	11.00	Boole & Babbage Inc.	14.00	2.00	16.67
OTC	43.25	10.63	Borland Int'l	43.25	4.13	10.54
NYS	11.88	0.88	Businessland Inc.	1.00	0.00	0.00
NYS	11.00	4.25	Cognos Inc.	11.00	2.00	22.22
NYS	16.88	4.38	Computer Associates	7.88	0.38	5.00
OTC	17.25	7.75	Computer Horizons	15.25	-0.25	-1.61
NYS	53.25	36.75	Computer Sciences	49.13	-3.13	-5.98
NYS	12.25	6.63	Computer Task Group	7.88	-0.38	-4.55
OTC	25.25	13.25	Comshare Inc.	13.25	-2.75	-17.19
OTC	16.00	3.75	Corporate Software	9.75	3.25	50.00
NYS	43.00	24.38	General Motors (cl e)	41.50	0.00	0.00
OTC	18.25	7.25	Goal Systems Int'l	14.25	2.00	16.33
OTC	4.75	1.88	Hogan Systems Inc.	2.63	0.25	10.53
OTC	9.75	5.00	Index Technology	7.25	-0.50	-6.45
OTC	16.63	7.75	Information Resources	11.88	1.38	13.10
OTC	17.50	2.63	Informix Corp.	3.25	-0.06	-1.90
OTC	7.63	1.38	Intellicorp Inc.	2.13	0.31	17.21
OTC	8.00	2.50	Interleaf Inc.	5.25	1.88	55.56
OTC	27.50	10.00	Knowledgeware Inc.	24.13	0.13	0.52
OTC	34.50	16.75	Legent Corp.	34.50	4.25	14.05
OTC	39.25	12.50	Lotus Development	18.13	-0.25	-1.36
OTC	28.25	13.63	Micrografx	21.50	-2.50	-10.42
OTC	91.00	45.00	Microsoft Corp.	90.50	6.50	7.74
NYS	10.13	4.00	On Line Software Int'l	6.50	0.75	13.04
OTC	28.38	4.88	Oracle Systems	6.75	1.13	20.00
NYS	17.88	7.00	Parasophic Systems	9.88	0.75	8.22
OTC	5.38	1.25	Phoenix Technologies	4.50	0.88	24.14
NYS	43.75	30.75	Policy Management Sys.	43.75	2.25	5.42
NYS	23.63	11.50	Reynolds & Reynolds	16.88	0.00	0.00
OTC	16.13	6.88	Sage Software Inc.	7.75	0.50	6.90
OTC	22.25	14.50	SEI Corp.	18.50	0.00	0.00
OTC	18.38	12.00	Shared Medical Systems	15.13	-0.38	-2.42
OTC	28.00	12.00	Software Publishing Corp.	20.75	-4.13	-16.58
NYS	11.00	5.50	Sterling Software	9.25	1.25	15.63
OTC	26.00	9.50	Surgard Data Sys.	11.63	0.63	5.68
OTC	35.25	16.25	Symantec Corp.	34.75	2.25	6.92
NYS	24.88	4.50	System Center Inc.	5.25	0.25	5.00
OTC	30.75	12.75	System Software Assoc.	30.75	3.50	12.84
OTC	27.38	4.75	Wertek	11.00	2.38	27.54
Semiconductors					**Up 7.14%**	
NYS	25.88	17.63	Advanced Micro Devices	20.50	0.50	2.50
NYS	8.63	5.50	Analog Devices Inc.	7.75	0.63	8.77
OTC	23.50	5.25	Chips & Technologies	9.00	0.75	9.09
OTC	52.00	28.00	Intel Corp.	43.75	1.75	4.17
NYS	13.00	5.13	LSI Logic Corp.	6.75	0.25	3.85
NYS	16.38	6.75	Micron Technology	11.13	-0.25	-2.20
NYS	88.38	45.75	Motorola Inc.	50.88	5.00	10.90
NYS	8.88	3.00	National Semiconductor	5.50	0.00	0.00
NYS	44.00	22.50	Texas Instruments	37.63	-2.63	-6.52
OTC	12.25	3.00	VLSI Technology	7.13	1.25	21.28
ASE	14.88	4.00	Western Digital Corp.	5.25	0.75	16.67
Peripherals & Subsystems					**Up 2.66%**	
OTC	2.38	0.09	Alloy Computer Prod.	0.31	0.00	0.00
OTC	2.50	0.88	Apertus Technologies	1.44	0.00	0.00
OTC	41.25	12.38	AST Research Inc.	40.38	0.38	0.94
OTC	24.00	7.50	Banctec Inc.	8.13	-0.13	-1.52
ASE	7.63	3.13	Cognitronics Corp.	7.13	0.13	1.79
NYS	31.25	12.38	Conner Peripherals	24.25	-2.25	-8.49
ASE	22.00	7.00	Dataram Corp.	8.50	-0.13	-1.45
NYS	10.50	4.13	EMC Corp.	10.38	0.38	3.75
NYS	43.88	33.75	Eastman Kodak Co.	40.13	0.38	0.94
OTC	8.50	4.38	Emulex Corp.	6.88	1.25	22.22
OTC	34.50	14.00	Evans & Sutherland	19.00	-0.25	-1.30
OTC	6.25	3.13	Iomega Corp.	4.38	-1.13	-20.45
OTC	21.00	6.00	IPL Systems Inc.	21.00	5.75	37.70
OTC	2.06	0.13	Maxstor Systems	0.47	0.03	7.08
OTC	17.00	2.63	Maxtor Corp.	3.50	-0.13	-3.45
OTC	10.75	3.88	Micropolis Corp.	10.25	1.00	10.81
NYS	91.38	73.63	3M Corp	81.13	-4.00	-4.70
NYS	14.50	6.00	Printronix Inc.	7.50	0.25	3.45
NYS	21.25	8.50	QMS Inc.	16.00	-0.50	-3.03
OTC	25.75	8.88	Quantum Corp.	17.50	-3.00	-14.63
NYS	6.88	4.38	Recognition Equipment	5.25	0.13	2.44
OTC	9.88	4.00	Rexon Inc.	6.88	1.00	17.02
OTC	19.75	5.63	Seagate Technology	12.75	-0.25	-1.92
NYS	35.25	11.00	Storage Technology	25.50	2.00	8.51
OTC	4.00	0.63	Tandon Corp.	2.19	0.25	12.90
NYS	19.50	11.63	Tektronix Inc.	19.25	0.38	1.99
OTC	0.63	0.16	Televideo Systems	0.22	0.00	0.00
NYS	56.75	29.00	Xerox Corp.	43.88	1.63	3.85
Leasing Companies					**Off 2.24%**	
OTC	10.50	6.88	Amplicon Inc.	8.50	-0.50	-5.56
OTC	4.38	0.31	Capital Associates	0.47	0.03	7.08
NYS	28.50	14.63	Comdisco Inc.	24.50	1.50	6.52
OTC	16.25	9.25	LDI Corporation	11.63	-0.13	-1.06
OTC	5.88	2.25	Selecterm Inc.	2.25	-0.50	-18.18

digital *In Transition*

Continued from page 1

transition to a software, networking and services company, although he said he believes this will take up to four years.

"We are trying to make a wide range of products, from PCs to mainframes, with all the components," Olsen said last week. "That is a massive job."

The move to open systems is believed to be a sincere, if somewhat belated, move in the right direction, according to *Computerworld* interviews with dozens of customers and industry analysts in recent weeks.

"Open systems means, to us, conformance to a specified set of standard interfaces," said David Stone, the DEC vice president who was recently appointed to a restructured software organization encompassing everything but the VMS operating system.

"DEC is certainly well ahead of IBM as a network integrator," said Kevin Obermann, network manager for the engineering department at Lawrence Livermore National Laboratories in Livermore, Calif.

"I think DEC has decided its future is not in selling boxes but in controlling the network," said Ken Krallman, MIS director at Carleton Technologies, Inc. in Orchard Park, N.Y. "But I look at DEC as the perfect example of tremendous products and lousy marketing."

Although many customers retain their loyalty and confidence in the vendor, they have raised sharp questions not only about DEC's marketing weakness but about the abilities of its sales force to adapt to a complex, increasingly varied product line (see story below).

"We fell down in educating [our sales force] in our products," Olsen conceded last week, adding that the company's products have become increasingly complex.

Customers also said they are concerned about the quality and pricing of DEC software.

"DEC is releasing so many software products, it seems to me that in their frenzy to get to market, the testing is not as thorough anymore," said Robert Forster, DEC project leader for the information management department at Sikorsky Aircraft Corp. in Stratford, Conn. "Out of 45 to 50 layered products we run here, I'm running at least a third of them on [software] patches right now."

Peter Coriaco, vice president of technological strategic planning at Bankers Trust Co. in New York, agreed that DEC needs to improve the quality of VMS and its layered products. "I'm not talking about fancy features. It runs, and then it breaks," he said.

These problems are acknowledged at the highest levels within DEC. The VAX systems and VMS division, for example, established more rigorous integration testing for VMS and its layered products three months ago.

"Our software is not degrading in quality," Stone insisted. Instead, he said, the expanding interoperability and complexity of DEC and third-party vendor software at large customer sites is forcing DEC to work on unfamiliar ground with larger networks than ever before.

Users interviewed by *Computerworld* also seemed universally opposed to DEC's intention to "unbundle" some of the features in VMS, which will strip the operating system down to a cheaper basic version and a bevy of more expensive versions with additional features, such as those enabling distributed computing.

The lack of corporatewide licensing is another prickly issue with DEC users, particularly those with global businesses. DEC is now reworking its software pricing and licensing fee structure with an eye toward changing the company's method of charging fees based on processor size. A charging system based on number of users will likely take its place, DEC said.

Despite the formidable challenges facing the company on both the technical and managerial fronts, confidence that they can pull it all off seems to run high at DEC.

"We have a love/hate relationship with some of our customers," said Jack Smith, senior vice president of operations at DEC. "I was visiting a customer recently who beat up on me for 15 minutes about software problems. Then after all that, he says 'The only saving grace you have is that nobody else can do it.' "

Love/hate relations with DEC reps

As variable as the weather from coast to coast, the field sales representatives from DEC invoke every reaction from admiration to despair in their customers.

It is these perceptions about quality and integrity in the field that shape the customer's view of the vendor — much more so than tumbling stock prices, pessimistic analysts or internal squabbles at the home office.

Carleton's *Krallman*

At best, customers said the quality of DEC service and support varies widely in terms of location and length of service on their accounts.

"You meet young salespeople all the time, but they don't stay salespeople," said Ken Krallman, MIS director at Carleton Technologies.

DEC officials acknowledged the uneven quality of their sales representatives and account managers, but they stressed that training and education for those groups are top priorities.

Some customers said their representatives do understand their businesses' needs, while others constantly have to educate their account managers on DEC's own products.

"I'm usually telling the DEC salesmen what they should be pushing," said George Reid, MIS director at Sanford C. Bernstein & Co. in New York. "I tend to know as much about what DEC is doing as the salesman."

A worst-case scenario with the sales force unfolded recently at the Health and Tennis Corporation of America in Los Angeles. Systems support supervisor Michael Artukovich became entangled in DEC's recent crackdown on the used-equipment market when he purchased used CPU boards from a third-party broker to upgrade his VAX 8330s to 8350s. At one point, the DEC sales representative threatened the company with legal action in a dispute over a licensing fee that was eventually settled out of court.

DEC's downsizing: 'No problem'

DEC may no longer be the darling of Wall Street — with its stock prices plummeting more than 50% in the last two years — but customers find comfort in the company's cost-cutting drive and restructuring.

"They must get costs in line with sales," ITT Hartford's John T. Crawford said.

Crawford and other users said customers have a hard time understanding the significance of DEC's reorganizing frenzy and as yet detect little change in how the firm is run.

"I get what I pay for, and I'm not concerned about their financial viability," said John E. Nack, processing network division manager at Caterpillar Tractor Co. in Peoria, Ill.

Sanford Bernstein's *Reid*

"It is to be expected that they will have turbulence when they are downsizing and trying to reduce their overhead," added Michael Artukovich, systems support supervisor at the Health and Tennis Corporation of America in Los Angeles.

DeWitt Howard, engineering system manager at Interstate Electronics Corp. in Anaheim, Calif., considers DEC to be in stable financial health.

"They still have liquid cash, which is amazing at this time, and that is holding them together and letting them do engineering for new products," Howard said.

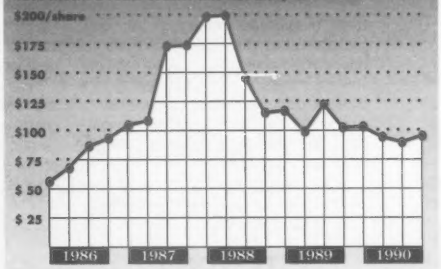
George Reid, MIS director at Sanford C. Bernstein & Co. in New York, also feels secure with DEC.

"There was a big to-do because they had a quarter where they didn't make money, but that's a far cry from [other minicomputer vendors], which are all hemorrhaging," he said.

Tossin' and turnin', turnin' and tossin'

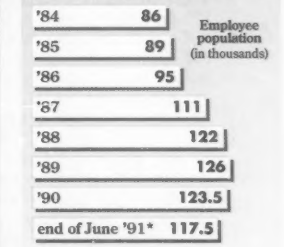
Wild ride

DEC's quarterly high stock prices for the past five fiscal years have shown a roller coaster-like rise and fall



Tightening up

DEC's employee population is on the decline, having peaked in 1989



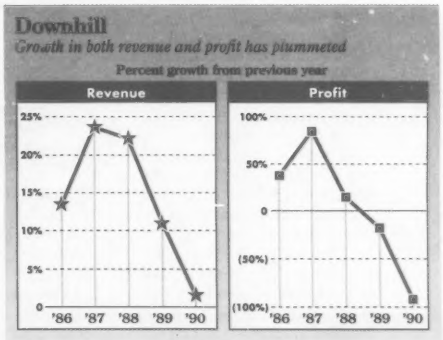
CW Charts: Marie Haines

The ups and downs of DEC

From the dizzying heights of $200-per-share stock prices and 126,000 employees worldwide in 1987 to 1989, DEC's plunging fortunes in the past two years dramatically highlight its need to cut costs and personnel. DEC is restructuring through early retirements, layoffs, management changes and facilities consolidation. Customers and analysts approve, saying DEC is making the right moves to align itself with the economic realities of the 1990s.

Downhill

Growth in both revenue and profit has plummeted



COMMENTARY

Gary H. Anthes

Electronic heroes

If combat awards went to nonhumans, computers might win a Medal of Honor for action in the Persian Gulf so far. That was not the case the last time the U.S. fought a real war. Twenty years ago, there was a handful of computers in Vietnam, and they weren't flying.

I was in charge of the U.S. Navy Supply Corps' aging IBM 1401 in Da Nang. The computers weren't doing such razzle-dazzle things as shooting down Scud missiles; the primary application on the 1401 was inventory control. But there was a lot of inventory to control — 105,000 line items, from bullets to frozen lobster to penicillin. The poor 1401 ran flat-out three shifts per day, seven days per week.

My job had its good points, relatively speaking. Because my office adjoined the computer room, I was among the few people in the country who always had air-conditioning.

But there were drawbacks. Because most supplies came by ship across the Pacific, a bug that shifted a decimal place might mean weeks without some vital part or supply.

Downtime was intolerable. Two IBM engineers who lived off base refused to come in at night without an escort, and more than once I found myself riding shotgun — actually my .45-caliber pistol and M-16 rifle were almost solely for show — to bring them back.

One night my world came crashing down. An enemy rocket landed on a stack of 6,000 antitank mines. The shock flattened the building in which I worked. No one was seriously hurt, and the computer escaped relatively unscathed.

But it sat idle for several days while a new air-conditioned facility was built for it. In the meantime, we were able to get some processing done using the punch card accounting machines. Now the wizards weren't the programmers, but the elite few who could wire the big square patch panels that "programmed" the machines.

They don't teach that skill to military recruits anymore. Nowadays a sailor is more likely to learn about embedded systems, artificial intelligence and target-recognition algorithms.

Computers play vital role in war

Continued from page 1

and match planes to targets and even to try some simulations to assess the likely effectiveness" of a particular battle plan, said Paul B. Stares, a senior fellow at Brookings Institution in Washington, D.C.

The not-so-simple idea is to match military assets to enemy targets and provide the sequencing for the operation. "The ultimate aim of command-and-control is to apply all of the combat forces you have at the right place, at the right time and in the right amounts," explained Andrew Hesser, a command-and-control expert at Battelle-Pacific Northwest Laboratories in Richland, Wash.

The daily ATO is produced by Air Force-developed software running on a small mainframe computer housed in a shelter outside the Tactical Air Control Center in Riyadh, Saudi Arabia, according to Brig. Gen. Bruce Bohn, head of information systems for the Tactical Air Command headquarters at Langley Air Force Base in Virginia.

Relevant portions of the common ATO are sent down the chain of command via satellite to the numerous bases and units with small-aperture satellite terminals, analysts said.

Besides the command center, the indispensible part of the battle-management architecture is the airborne warning and control system plane with its funny-looking radar dome, which can detect and track all aircraft within 300 miles, direct fighters to their targets and handle air-traffic control as well.

When enemy aircraft is spotted, controllers relay data about the general location to the fighters, which use their own radar to pinpoint the target.

Likewise, two still-developmental Joint Surveillance and Target Attack Radar Systems radar planes scan enemy territory for signs of tanks or Scud missile launchers and relay targeting information to ground or air forces.

The multinational air assault worked so well "because we all fly off a common tasking order" that is generated by computer at U.S. Central Command in Riyadh, Horner told reporters at a Jan. 18 briefing.

"It's an enormous effort. Of course, now we have a lot of computers, and you can bring together the tens of thousands of minute details," Horner said.

Furthermore, elaborate radar networks for air-traffic control and battle management — integrated and controlled by computers — have enabled U.S. commanders to mount much more complex attacks than in the past.

One congressman said the airspace was so crowded that it made air-traffic control at Chicago's O'Hare airport look simple. Computer-aided jamming equipment befuddled Iraqi radar and cleared a path for incoming fighter bombers.

However, Pentagon officials warned against the impression that this war is just one big video game. Humans are in command, in the line of fire and in captivity. In fact, the noted success of the high-tech cruise missiles may be linked to the legendary temper of the top U.S. commander, Gen. Norman Schwarzkopf.

According to *Newsweek*, Schwarzkopf was "incredulous" in early August when he learned that the digital maps needed to guide the missiles did not exist, so he "used his considerable temper to get them made."

Despite all the computers, coordinating a multinational force — with its conglomeration of dissimilar weapons, equipment and languages — is never easy, analysts said.

"It's no accident that people use artistic terms like orchestrate and choreograph when they talk about coordinating multinational operations," Stares said. .

MISSILE GUIDANCE

Missiles and smart bombs get their intelligence from computers at three levels. Detailed targeting instructions come from mainframe computers at U.S. Central Command. Launch and control information comes from local, weapon-specific computers on the ground, in a plane or on a ship. Finally, the missile or smart bomb finds its target by navigating under control of on-board computers.

The low-flying U.S. Navy Tomahawk cruise missile, which reportedly hit 51 of its first 52 targets, uses an inertial guidance system to orient the ship-launched missile to a reference area on the coastline. An on-board computer guides it on a flight path based on coordinates entered before its launch.

Computers in the missile make course corrections by comparing key features in the terrain with terrain altitude checkpoints stored in an on-board database. Finally, the surface-hugging missile scans the target area optically and compares the target image with an on-board digitized "map."

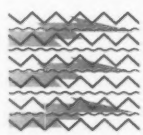
The Tomahawk actually uses a customized imaging coprocessor that can compare 1 billion pixel pairs/sec., said Gerald Miller, deputy program manager for the U.S. Navy Cruise Missiles Project.

The U.S. Army's Patriot antimissile missile uses a ground-based radar beam to spotlight and follow its target. The Patriot missile is launched manually or under software control and then picks up radar reflections off the target and relays its view of the target to a ground station. There, a computer compares the reflected radar as seen by the Patriot to that reflected directly to the ground, calculates the trajectories and speeds of both the target and the Patriot and then issues course corrections back to the missile.

Smart bombs use cooperating computers in the aircraft and in the bomb. The pilot aims at a television picture of the target by adjusting cross hairs on the display, then locks a laser onto the target. The pilot can veer away, letting laser reflections guide the bomb.

GARY H. ANTHES

ELECTRONIC COUNTERMEASURES



Turn on a power drill next to your television set and you may get the same kind of electronic interference that can really mess up enemy radar.

That is the whole point of the military's "electronic countermeasures" equipment. Before each air strike over Iraq, U.S. and British jamming planes use on-board computers to identify the signature of an enemy radar and then blind it with "white noise," thus creating a temporary safe pathway through Iraqi air defenses.

"They see their [radar] screen as being whited out [with] large strobes coming across it. By that time, they know that something is coming at them, but they don't know at what altitude or direction it is coming from," said Navy Lt. Fred Drummond, an electronic warfare specialist in an interview by pool reporters in Saudi Arabia.

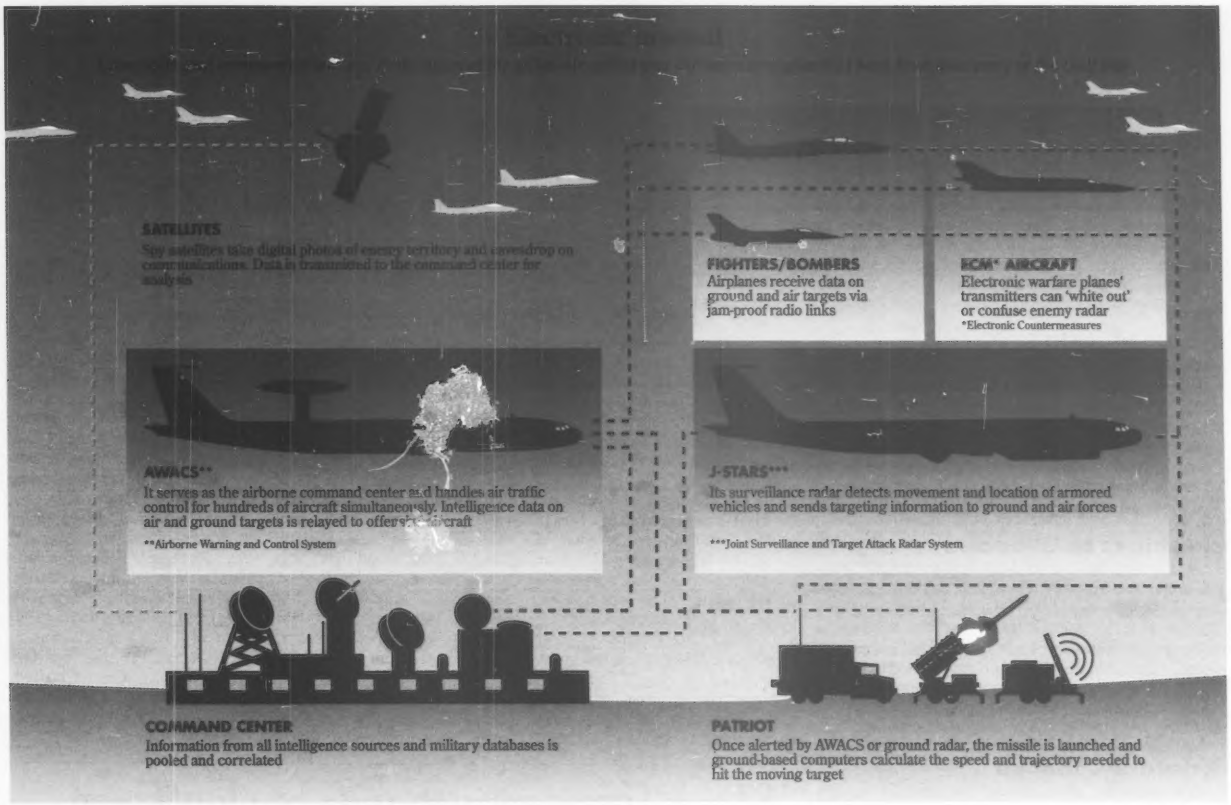
On the U.S. Air Force's EF-111A Raven, the jamming functions are managed by an electronic warfare officer using an on-board computer, which enables the officer to handle a tactical work load that used to require several operators. For example, preflight programming of the computer with known radar signals enables the operator to concentrate on unanticipated radar threats, according to the prime contractor, Grumman Corp. in Bethpage, N.Y.

Electronic jamming equipment sends out signals that crimp enemy radar, for example, by cramming the airspace with high-powered signals on the enemy's precise wavelength.

Likewise, the U.S. Navy's jamming aircraft, the EA-6B Prowler, detects radar and feeds that information into an on-board computer, which processes the signals for cockpit display and recording, a Grumman spokesman said.

Aircraft with missiles designed to knock out the radar stations and other Iraqi air-defense targets scooted through the corridor created by these radar-jamming planes. Next in line were the allied bombers, which were able to fly nearly unscathed to targets in Iraq and Kuwait, thanks to the electronic warfare that preceded them.

MITCH BETTS



Graphics: Tom Monahan

RECONNAISSANCE AND SURVEILLANCE

The first line of defense for the forces of Operation Desert Storm orbits hundreds of miles above the earth, where supersensitive spy satellites can eavesdrop on Iraqi military communications, detect an enemy rocket launch and give pilots the information needed to deliver devastatingly accurate strikes.

The workhorses of the group are signal intelligence (Sigint) satellites, which give an advance peek at the Iraqi electronic defenses from about 400 miles away from Earth. Sigints are equipped with antennas and an array of signal processors that detect the location and capabilities of radar stations, navigation aids, communications transmitters and telephone lines.

Also circling the earth are several KH-11 and KH-12 observation satellites that transmit high-quality television signals, which are in turn translated into photographic images.

The information gathered by the satellites is digitally transmitted to ground receiving stations and processed at interpretation centers.

In addition, the U.S. Air Force's Defense Support Program is a network of satellites orbiting more than 20,000 miles high that use infrared telescopes to detect the hot fumes of incoming aircraft or ballistic missiles.

Closer to the ground, the chief surveillance method is the E-3 Sentry Airborne Warning and Control System (AWACS) planes, which are modified Boeing 707s with a saucer-shaped rotordome with banks of computers and radar screens. An AWACS plane flying over Saudi Arabia at 29,000 feet can track aircraft taxiing on runways north of Baghdad, then direct allied aircraft to intercept the incoming raid.

Additionally, the new Joint Surveillance and Target Attack Radar System (J-STARS) is a radar-loaded Boeing 707 that flies high over Saudi Arabia and tracks targets up to 125 miles behind enemy lines. Information is sent to field commanders, who can order air assaults. However, critics charge that the J-STARS cannot distinguish between, for example, a tank or a school bus.

JAMES DALY

AIRCRAFT AND NAVIGATION

Behind Operation Desert Storm's air attack is a computer-driven score that is designed to inflict maximum damage with minimal casualties.

The more than 10,000 sorties flown in the first week of the war were organized into discrete "force packages," which are symbiotic groups of planes, each bearing specialized capabilities. Leading the pack and flying flank guard for the fighter planes are EF-111A Raven defense-suppression aircraft, which jam long-range Iraqi radar. F-4G Wild Weasels also send jamming signals that create a path for the fighters to fly through. Additionally, the planes can carry antiradiation missiles, which hone in on air defense radar emitting electromagnetic waves.

Leading the aircraft strikes is the F-117A Stealth fighter, along with F-15E Eagles and F-16 Fighting Falcons equipped with "smart bombs," which their admirers said limit destruction, spare civilian lives and quicken results. The operator brings the target into the cross hairs on a cockpit video display, then locks the bomb's imaging infrared camera onto it. Accuracy is said to be within 30 feet.

Some of the F-15s and F-16s use an advanced navigation and targeting system called Low Altitude Navigation and Targeting (Lantirn), which consists of a pair of pods slung under the wings that incorporates the information gleaned from satellites to deliver bombs with great precision.

Detailed targeting information — containing everything from roads leading to the bombing site to what the buildings look like from above — is preprogrammed and preinstalled into Lantirn before the jet leaves the ground. Once over the target, the pilots perform rudimentary scene-matching functions before letting their bombs fly.

"When these guys were dropping bombs down ventilator shafts, it wasn't because they were winging it when they got there — the location of each shaft had been programmed for a long time," said the Federation of American Scientists' senior analyst John Pike.

JAMES DALY

High-tech triage

For the first time in a war situation, surgeons in Operation Desert Storm have access to the U.S. Army's most advanced automated medical system from the mobile medical units 10 to 15 miles behind the front lines.

Doctors will be able to use the Theater Army Medical Management Information System to quickly pull up patients' medical records, administer preliminary care and send computer messages to the next appropriate hospital or medical unit for soldiers who need intensive care. The system is also connected to the central command computer center in Germany by radio transmission and telephone lines.

The system, based on Intel Corp. 80386-based Unisys Corp. workstations running CTOS, should be able to send patient records to and from the field units in seconds, said Col. William Pulver, a program executive officer at the Pentagon's Standard Army Management IS Department.

Tests have been conducted, said Noel Goyette, chief of the IS operations branch at the U.S. Army IS Command headquarters. "I'm not saying that we won't have problems, but we do the best we can."

MAURA J. HARRINGTON

Due to a lack of photographic contrast, this page did not reproduce well.

NEWS SHORTS

Profit dip for AT&T

AT&T rang in last week with fourth quarter revenue up 7% to $9.96 billion, but quarterly profits slid to $698 million, down 1% from $705 million one year earlier. For the full fiscal year, however, the telecommunications giant reported that net income increased 1.4% to $2.37 billion, on revenue up 3.1% to $37.29 billion. In light of "a deteriorating economy," the company said, "we are pleased with these results."

Esber cuts all Ashton-Tate ties

Edward M. Esber Jr. severed his last ties with Ashton-Tate Corp. last week when he resigned from the board of the Torrance, Calif., database application maker. Esber had served as the company's chairman and chief executive officer for five years before resigning last May amidst a string of product foulups and quarterly losses. Ashton-Tate officials said they do not intend to replace him on the board.

Oracle shines to Windows

Oracle Systems Corp. last week introduced Oracle Card, a database client for both Microsoft Corp. Windows 3.0 and Apple Computer, Inc.'s Macintosh environments. The company said the product, its first for the Windows market, enables users to build front-end applications for Oracle systems that will run unmodified under the point-and-click interfaces offered by Microsoft and Apple. The company said the product will be priced at $299 and will be available in the second quarter.

CA updates PC tool kit

Computer Associates International, Inc. said last week that it is shipping its long-promised personal computer version of the Datacom/DB mainframe database, CA-Datacom/PC. CA also said it is shipping a beta-test version of CA-IDMS/PC Release 2.4, a product intended for cooperative processing and downsizing of mainframe applications. The IDMS/PC release, priced at $10,500, boosts system memory from 640K to 16M bytes and includes a computer-aided software engineering system that allows PCs to double as development workstations and database servers.

Network General profits up

Network General Corp. announced third quarter revenue of $12 million — a 50% jump over the $8 million reported for the comparable period last fiscal year. Net income for the Menlo Park, Calif.-based company rose to $2.1 million, 26% above the $1.7 million recorded in the previous third quarter.

Multivendor structure set

Nippon Telegraph and Telephone Corp. (NTT) introduced its Multivendor Integration Architecture last week. The set of software standards developed through a consortium comprised of NTT Data Communications Systems Corp., IBM Japan Ltd., Digital Equipment Corp., NEC Corp., Hitachi Ltd. and Fujitsu Ltd. will allow applications from each vendor to interoperate on NTT's network. "This is very significant because it simply says 'here are the standards, and any supplier who follows these rules, NTT will buy from them,' " DEC President Kenneth H. Olsen said last week.

Prime pumps up MIPS

Prime Computer, Inc. announced reduced instruction set computing-based Unix machines last week. The EXL 7363 departmental system is targeted for commercial applications and can support as many as 300 users. With a 33 million of instructions per second rating, the system offers 32M to 256M bytes of main memory and 1G to 20G bytes of disk storage. It is priced from approximately $75,000. The EXL 7660 is a compact, less expensive version of the company's EXL 7680, and it provides from 32M to 128M bytes of memory, with prices beginning at $190,000. Both units are scheduled for delivery in March.

Wang in red, DG back to black, and Conner shines

BY NELL MARGOLIS
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. blamed the gathering forces of war and recession last week for the halt in what analysts had hailed as a heroic march toward profitability.

However, some industry observers said the economic factors that have helped push Wang back into the red could buy the firm precious time in which to complete a critical product line turnaround.

For the quarter ended Dec. 31, Wang posted a net loss of $24.7 million on revenue of $551.5 million, down 15% from revenue for last year's comparable quarter. The loss was expected, several analysts said.

Wang Chief Executive Officer Richard Miller noted the havoc wreaked on Wang's turnaround by economic crises that have taken a toll on banking, government and insurance — all traditional Wang bastions.

The global economic woes that have temporarily derailed Wang's recovery could end up actually aiding the firm, said Chris Christiansen, an analyst at Westport, Conn.-based market research firm Meta Group, Inc.

"Customers are realizing how costly conversion can be," he noted. "Some who might otherwise have changed systems and vendors are bound to reassess and to stick with Wang longer than they'd planned."

Analysts agreed last week that the disappointing earnings report is a probable indication of more job cuts to come. "I think Wang is going to survive," said Mary Rhodes, an analyst at Southport, Conn.-based New Science Associates, Inc., "but certainly as a much smaller, niche-oriented company."

Elsewhere in the industry

Meanwhile, a recent flurry of worry over Sunnyvale, Calif.-based Amdahl Corp.'s health appeared to be contradicted by the mainframe contender's fourth quarter financials. Amdahl posted quarterly net income up 47% to $61.3 million on revenue up 3% to $644.4 million.

Software player Computer Associates International, Inc. saw fourth quarter revenue rise 10% to $381.4 million, while profits fell by the same amount to $63.5 million. Both figures agreed with Wall Street expectations, analysts said.

Long-beleagured Data General Corp. reported revenue up 7.2% to $311.7 million and a $12.4 million profit, in contrast to a $20.5 million net loss in last year's comparable period. The company credited cost-reduction efforts and increased sales of its Aviion workstations.

San Jose, Calif.-based disk-drive player Conner Peripherals, Inc. — one of Wall Street's darlings last year — announced that its year-end revenue increases of 90% to $1.34 billion and a 1990 profit of $130.1 million was a 213% leap. For the quarter closed Dec. 31, Conner posted net income of $47.4 million, up 225%, on revenue increased 85% to $418.4 million.

Stock firms may merge back offices

BY CLINTON WILDER
CW STAFF

NEW YORK — Recession-plagued Wall Street is hoping to cut costs by teaming up on back-office operations, but analysts warned of major technology barriers to such mergers.

Prudential-Bache Securities, Inc. confirmed last week that it is discussing with Shearson Lehman Brothers, Inc. the idea of combining their back offices, which are hampered by unused capacity because of low trading volume. An agreement could reportedly be signed within a month and could include other brokerage firms as well.

Like most big brokerage firms, Prudential-Bache and Shearson significantly increased their trade processing capabilities in the late 1980s as trading volumes soared. Now, with all of Wall Street in a cost-cutting mode, they said they believe they can realize significant economies of scale by merging operations.

However, that is easier said than done, according to securities processing experts. First and foremost, bringing back-office operations together would not work as a merger of equals, said Scott Smith, senior manager at the New York office of information systems consultancy Nolan, Norton & Co.

"Most back-office systems on [Wall] Street are not very modular," he said. "One firm will have to be the prime contractor and, in effect, subcontract processing services to the other firm."

The communications bridge between the back-office trade processing systems and the front-office systems used by brokers will be the biggest technology challenge, Smith said. "If I'm the subcontracted company and I need the relational copy of the [trading] data, where will it be located? It will be interesting to see how they organize it."

Merging operations would also create "a single point of exposure" for two companies to natural disaster or computer crime, according to Howard Mannella, director of Nolan, Norton's annual study of Wall Street trade processing costs.

Copy crusade

CONTINUED FROM PAGE 1

be required to destroy more than 100 illegal copies of Wordperfect Corp.'s Wordperfect package and Lotus Development Corp.'s 1-2-3 spreadsheet.

Ted Tetzlaff, Kemper's attorney, said the case was actually settled within a week of the SPA's raid. Tetzlaff said that low-level employees who wanted access to software were responsible for the copying and that the "person responsible" for allowing this had left the firm by the time the SPA raided it.

The SPA told *Computerworld* that it is also near a settlement with Davy-McKee Corp., whose Chicago office was the other target in a Nov. 19 raid. The settlement with Davy-McKee could be the largest in SPA history, but Ken Wasch, executive director of the SPA, refused to give details, pending the outcome of the case. According to sources, the settlement against Davy-McKee is expected to be smaller than it might have been because the company agreed it was in error and has agreed to self-audit its other offices around the country. One source estimated that nearly 1,000 illegally made copies of software were found in the Chicago office alone.

Davy-McKee's attorney refused to comment on the case until it is complete.

"Davy-McKee reflects a fairly typical business — it's an honest, upstanding, honorable company that lost sight of their PC management," Wasch said. "Everybody has the problem — even [the SPA]. What we're trying to do is help them to bring it under control."

In discussing the upcoming raids, Wasch said he expects that the SPA will pursue such cases more aggressively this year than it has in the past. He predicted that the organization will conduct more than 100 audits on corporations, as opposed to 80 in the 1½ years since it began its audit program.

FTC probe of OSF said to focus on tech pricing

BY JOHANNA AMBROSIO
CW STAFF

CAMBRIDGE, Mass. — The Federal Trade Commission (FTC) is investigating the Open Software Foundation (OSF) for unfair trade practices and anti-trust violations, industry sources confirmed last week.

At issue is the process by which the OSF selects the technology included in its products, how it prices its products and how it pays for technology.

A spokesman for the FTC's Competition Litigation Division would neither confirm nor deny reports of an investigation, saying such information is not made public unless the government files a lawsuit. No formal legal action has been taken, he said.

An OSF spokeswoman said the OSF had not been contacted by the FTC.

However, executives at two independent software vendors confirmed a report in the industry newsletter "Unigram-X" that the investigation appears to be entering a more serious phase. One executive has met and the other will soon be meeting with FTC lawyers.

The OSF's best-known sponsor, IBM, is treating the matter as "rumor," said Dale Harris, a manager at IBM's Open Systems Group in Austin, Texas.

Harris claimed that the OSF's rival groups, including Sun Microsystems, Inc. and AT&T, might be behind the allegations. "Some groups are becoming very nervous about the OSF's success," he said. Executives of Unix System Laboratories, Sun and Unix International have denied the charge.

"This is not between OSF and us; it's between OSF and the independent software vendor community," countered Roel Pieper, vice president of sales and marketing at Unix System Laboratories in Morristown, N.J. "This is a very serious matter that has been discussed in the industry for quite some time."

Although the OSF does not sell directly to users, it licenses its software for a fee to vendors. The crux of the dilemma is that unlike other industry consortia, the OSF functions as both a standards-setting organization and a vendor.

The OSF's products include the Motif graphical user interface and the OSF/1 operating system. The Distributed Computing Environment is scheduled to ship in June.

Misery loves company

One of the executives meeting with the FTC said he knew of several other vendors that will be doing the same. He added that the FTC had initially approached him earlier this month for some preliminary information but is now looking to take formal statements.

Independent software vendors took their complaints directly to the OSF in March 1990. At that point, they asked the OSF for "a formal set of guidelines about their pricing models and business practices relative to independent software vendors," said Larry Lytle, director of strategic relations at Netwise, Inc. in Boulder, Colo. The formal guidelines have "never materialized," he said.

The problem, Lytle said, is that the OSF offers extremely low prices for the technology it uses in its software and can thus keep its license fees low.

"OSF is a not-for-profit corporation and can afford to price its products low. But independent software vendors can't afford to give away their technology," Lytle said.

Jonathan Gossels, OSF business area manager, said his group pays "fair market prices" for the technology it uses. "We recognize that the independent software vendors are entitled to be compensated fairly."

Gossels said that of the OSF's 10 or so technology agreements, four are with independent software vendors. "Most of the noise is coming from independent software vendors that were not selected for our requests for technology and that have no knowledge of how we negotiate or do business."

Fujitsu product first of its kind

The DS/90 line of systems was announced at last week's Uniforum

BY CAROL HILDEBRAND
CW STAFF

DALLAS — On the hardware side of Uniforum, Fujitsu Ltd. moved to boost its presence in the U.S. midrange systems market when it unveiled the first product based on research by UK-based International Computers Ltd. PLC, a recent acquisition. The DS/90 line is a series of Unix-based midrange systems using Scalable Processor Architecture (Sparc) technology.

"It's interesting in that it's the first — or one of the first — Sparc clone systems from a major manufacturer," said Jonathan Blau, a senior analyst at New Science Associates, Inc., a research company in Southport, Conn.

The systems, which are expected to use Sparc processors from Cypress Semiconductor Corp., start at $50,000 for a 25-MHz model with 16M bytes of random-access memory and range to $200,000 at the high end for a 33-MHz system with 32M bytes of RAM.

Other happenings

Other Uniforum highlights included the following:

- Motorola, Inc. added three new models and several enhancements to its Delta Series 8000 group of Unix systems based on Motorola's 8800 reduced instruction set computing (RISC) processor.

The series is bracketed with new additions at both ends — the Model 8440 at the low end and the Model 8840 on the high-performance side. The Model 8640 is positioned as a midrange model.

Enhancements to the line include increased processor memory, more disk capacity and a new small computer systems interface (SCSI) controller. Prices range from $21,355 to $58,275.

- Sequent Computer Systems, Inc. introduced the Symmetry 2000 family of computers based on the firm's symmetrical processing architecture. The company showcased the S2000/70, an open systems mainframe ranging in price from $190,000 to $2.5 million.
- Waltham, Mass.-based Cambex Corp. announced the porting of Certi-Stream, its tape backup product, to AIX, IBM's Unix offering, for use on the RISC System/6000 platform. Available for all RS/6000 units running AIX Version 3.0 or higher, a single machine license costs $500.
- Cambex also showcased the Certainty 6200 series, a family of SCSI disk drives for the RS/6000. The drives connect to the RS/6000 SCSI attachment cards and range in price from $5,100 to $9,750.

Uniforum addresses user demand for Unix systems

BY JOHANNA AMBROSIO
CW STAFF

DALLAS — Users' longstanding complaints about the dearth of commercial Unix applications are starting to be addressed. At last week's Uniforum show — a forum that in previous years was dominated by basic business applications — vendors unveiled imaging systems, multimedia software and a bevy of connectivity packages.

Sun Microsystems, Inc. introduced a video capture system that allows users to freeze-frame a video from various sources, manipulate the image, store it and share it on a network. Videopix is based on a Sun Sparcstation and costs $895.

In a similar vein, Motorola, Inc. announced the Multipersonal Image Exchange System, an imaging system that includes scanning, editing, facsimile transmission and optical storage. Pricing for a single-user system, which does not include the personal computer engine needed to power it, starts at under $17,000.

A developer's tool kit to write Unix-based imaging applications is now available from Kofax Image Products, Inc. in Irvine, Calif. Available for $695, it allows users to write document imaging software for Kofax's KF-8200 Document Processor.

CD-ROMs a big hit

Compact disc/read-only memory (CD-ROM) is also making inroads in the Unix market. Highland Software, Inc. in Palo Alto, Calif., will distribute Unix applications from multiple software vendors on CD-ROM discs. Three CD-ROM versions will be issued for Hewlett-Packard Co., Digital Equipment Corp. and Sun workstations.

Even hardware vendors were showcasing software. Sunnyvale, Calif.-based Mips Computer Systems, Inc. announced five applications portfolios containing software for specific uses. These include portfolios for computer-aided software engineering, office automation and networking.

Announcements at the show included the following:

- Mountain View, Calif.-based Clarity Software, Inc. introduced Rapport, multimedia software that includes a compound document editor, spreadsheet, graphics and electronic mail. It also supports audio messaging and facsimiles. Rapport runs under the Open Software Foundation's Motif and Sun's Open Look graphical user interfaces on a variety of workstations from Sun, HP, IBM and DEC. It will sell for $895 per copy.
- Lynx Real-Time Systems, Inc. in Los Gatos, Calif., unveiled a Unix multiprocessing operating system it claimed is portable across a wide variety of hardware platforms. Until now, the company said, multiprocessing software had to be closely tied to the specific computer, making the various implementations incompatible.
- Mt. Xinu, Inc. in Berkeley, Calif., introduced a version of the Mach operating system for Intel Corp. 80386-based computers.
- Oracle Systems Corp. announced that its relational database management system will support AT&T's Unix System V, Release 4.
- At the same time, Oracle said that it will support the OSF's Motif graphical user interface in both its SQL*Forms and its SQL*Menu report-writing products.
- The Santa Cruz Operation in Santa Cruz, Calif., announced its version of Microsoft Corp.'s LAN Manager for Unix, along with an updated version of its Open Desktop graphical interface package.

Senior West Coast Editor Jean Bozman contributed to this report.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: back issues, if available, may be purchased at $2.00 per issue, plus postage. Call (800) 669-1002.

Subscription rates: $2.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.

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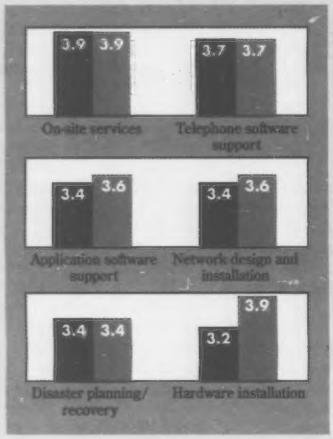
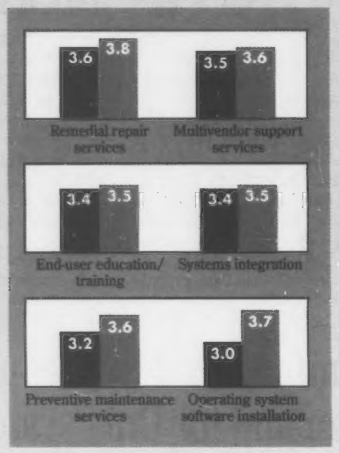
TRENDS

Personal Computers Service and Support

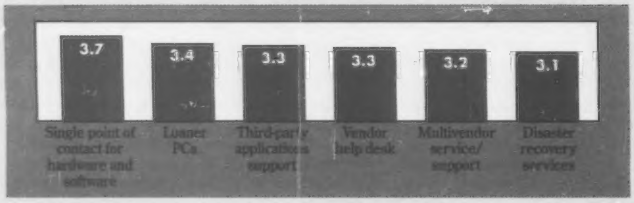
PC users are most satisfied with hardware installation and on-site services but claim it would be nice to have a single point of contact for both hardware and software problems



Ratings of vendor-supplied PC support services



Services most likely to attract new customers



(Mean rating base: 520)
Ratings based on a 5-point scale: 1 = not important, 5 = very important

Source: The Ledgeway Group, Lexington, Mass.

CW Chart: Doreen St. John

NEXT WEEK

When **Larry Liss**, senior vice president of operations and technology at Meritor Savings Bank of Philadelphia, entered a facilities management deal in 1989, he never imagined the level of systems integration that would result — or the effects it would have on the bank. Find out in Integration Strategies how Meritor continues to benefit.

Eli Albalancy

When it comes time to replace your current generation of personal computers, don't just think power. What organizations need is to make a revolutionary leap to a new breed of corporate workstation that enhances the way business users work. To see a rundown of the features that this machine is expected to have, read In Depth.

INSIDE LINES

Deere pulls in horns

Deere Technology Services has ended its aggressive move into the business of providing IS services to other firms, general manager Bill Rankin said. The firm is working exclusively for its parent company, tractor maker John Deere & Co.

Putting things in perspective

Ex-Mellon Bank IS chief George DiNardo reports he has already received word of very strong interest from two "major" firms. While he mulls it over, DiNardo has plenty else on his mind: He has one son commanding a U.S. Marine tank in Saudi Arabia and another in a recently called-up Marine Reserve unit. "We get an hour of sleep at a time and then go back to CNN," he said. "We're scared silly."

Serving to the backhand

"It's an awkward moment in time." That's all an IBM spokesman had to say when asked why the company's Token-Ring 16/4 bus-master server adapter A supports competitors' networking software rather than IBM's. The card supports Novell's Netware and Banyan Systems' Virtual Networking Software but not OS/2 Extended Edition or LAN Server. The demos of the card on LAN Server are apparently unreliable.

Classified protection

Facing potential terrorist attacks at airports and on airplanes, many Silicon Valley companies are instituting travel restrictions, but it's unclear whether they are more interested in protecting their knowledge pool or their employees. For instance, Sun's travel policy suggests that no more than three officers or five employees be on one flight at the same time. A Sun employee said that at the department level, however, it was even more restrictive: No more than one engineer from a particular group may travel on a plane.

Chilled-out disk-drive plans

Hitachi Data Systems has left some customers cooling their jets, as deliveries of the new HDS 7390 disk drives have slowed to a trickle. The reason, HDS admits, is a ramp-up problem both at the Odawara Works in Japan and at HDS' factory in Norman, Okla. HDS "stopped production of the 3380-compatible disk while there was still demand for it — and then it hit a manufacturing problem," said Mark Hess, head of Gartner Group's large-computer strategies group.

What's in their Poqet?

Poqet Computer has canceled advertising space and trade show appearances and stopped production of its current palmtop PC to focus on a new, slightly larger portable, sources close to the firm said. Furthermore, one source claimed, Poqet will eventually recall all of its palmtops and replace them with a redesigned palmtop. A spokesman denied canceling ads and trade show appearances but said the firm has temporarily halted production to make a routine engineering change.

A case of the acquisitives

Ernst & Young is expected to announce today that it is acquiring CASE Research Corp. in Bellevue, Wash., industry sources said. CASE Research principals Vaughan Merlyn and Greg Boone will join Ernst & Young's Center for Technology and Strategy, a Boston-based applied research facility. CASE Research is probably best known for its *Annual Report on CASE* and its Annual CASE Users Conference.

Filling up his Uniforum meeting calendar, the news editor agreed to meet with Intergraph, which said it was introducing a new workstation incorporating image functions. Moments before the meeting, he read a 'scoop' about the product in the Uniforum show's daily newspaper. Come the meeting, Intergraph said it had decided not to introduce the product and would instead target it for some specialized trade show we've never heard of. Hmmmm, what's really going on at the company, we wonder? If you know, fill News Editor Pete Bartolik in on what he missed by calling (800) 343-6474 or faxing the skinny to (508) 875-8931. You can also contact him electronically on MCI Mail, COMPUTERWORLD; Compuserve, 76537,2413; or Prodigy, MHTS78A.

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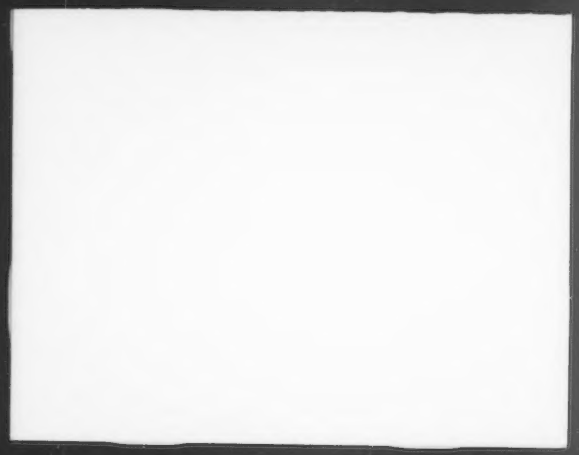

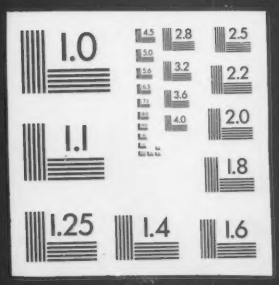
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